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CYSTS OF THE PROSTATE*

BY ROGER C. GRAVES, M.D.,† AND C. J. E. KICKHAM, M.D.†

WHEN we consider the anatomy and physiology of the prostate, it is surprising that obstructive retention cysts in the gland do not occur more often, but the infrequency of their mention in the literature seems sufficient evidence of their rarity. There was no careful study of the subject until 1921 when Young and Van Denburg, writing in Keen's Surgery, presented nine cases, five of which were from the Brady Urological Clinic. Prior to this time only occasional reports of isolated cases had been made. In 1925, Wesson offered a comprehensive review of the whole literature pertaining to prostatic cysts, and discussed the twenty-nine cases thus far reported and added three more from his own experience. Since the publication of this paper eleven additional contributions to the subject have been made by Keyes (2 cases), André, Papin and Verliac, Roberts, Hamer, Altmann, Hallock, Ssemenjako, Melen and Margold.

It is of historical interest that the first description of a cyst of the prostate is accredited, by Wesson, to Morgagni in 1769, and through the courtesy of Major Hume of the Army Medical Library in Washington, we have obtained the following English transcript of this portion of the original text. "In the year 1742, when I began the public demonstrations of anatomy, I made use of the body of an old man, whose disorders I could not get any certain information of; for which reason I shall tell you the more briefly, what preternatural appearances I met with. The kidneys were longer, in proportion to their breadth, than they naturally are. The coats of the bladder were much thickened.

"Finally, the prostate gland, where it possesses the anterior part of the urethra, had a cavity, entirely included within its substance, of the figure and magnitude of a middle-sized grape; the parietes of which, being of the same colour with the rest of the gland, seemed to be invested with a kind of thin membrane, as it were the follicle of the tumour; but within these parietes nothing was contained."

Our interest in this subject was aroused by the following case.

The patient, Pondville Hospital No. 4894, was referred to the Urological Clinic from the state prison colony at Norfolk, by Dr. Hilbert Day. He was white, Italian, aged 42, and gave his occupation as that of fireman. He came to the hospital, July 21, 1932, complaining of difficult urination.

One year before, he suddenly developed complete retention of urine. He was relieved by catheterization in a local hospital clinic where, according to his story, the diagnosis of stricture was made. After the passage of sounds, he could void fairly well, although he experienced an almost constant feeling of fullness of the bladder accompanied by a desire to urinate which was aggravated when in the recumbent position. These symptoms persisted with variable severity until two months prior to his coming to Pondville, at which time the obstruction became so acute that daily catheterization was necessary. There was no history of hematuria. Recently there had been one mild attack of pain in the right lower abdomen, accompanied by a chill. He said that he had lost twenty pounds in weight, within the past four months. Venereal infection was denied.

The past history seemed unimportant except perhaps that there had been an operation for hemorrhoids eleven years before, followed by a rectal stenosis requiring surgical relief on two subsequent occasions. The family history was negative; the patient was married and had two children.

Physical examination found a well-developed and well-nourished man of 42 years who presented the appearance of excellent general health. The color was good; the tongue was moist; the pupillary and knee reflexes were normal. The heart and lungs were normal. Blood-pressure, 132/84. In the abdomen, there was resistance to palpation, tenderness and dullness on percussion in the bladder region above the symphysis pubis. There was faint tenderness in the renal areas although the kidneys could not be felt. The external genitals were negative.

Cystoscopy: The instrument, size 21 French, was passed readily. Eight ounces of clear straw-colored residual urine was obtained. The bladder was spastic but otherwise within normal limits except for the internal sphincter margin. Here there was a definite bulging on the left side, almost cystic in appearance and probably completely filling the vesical outlet. The bulging surface was smooth and covered with normal mucosa. No bleeding was seen during the examination. On rectal palpation with the cystoscope still in position, the bladder floor was soft and the prostate was confined to its capsule, and movable. The right lateral lobe was small and a little firm and uneven in consistency.

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There was no thickening in the midline. The left lateral lobe was larger, softer, and slightly less definite in its borders. The seminal vesicles were not felt.

The urine was clear, amber color, specific gravity 1.011; acid; albumin-negative; sugar-negative; sediment—a few red blood corpuscles and white blood cells; crystals; spermatozoa. Total non-protein nitrogen 31 mg. per 100 cc. of blood. Wassermann reaction negative. No abnormality was found on x-ray examination of the pelvis, lumbar spine, and chest.

Suprapubic operation advised. Copy of surgical record, Pondville Hospital, August 3, 1932:

Pre-operative Diagnosis: This is a rare condition, and while a benign hypertrophy would be a favored diagnosis because of its greater frequency, a cyst of the prostate seems a strong probability.

Operation: Suprapubic cystotomy and destruction of cyst with electro-coagulation.

Anesthesia: Spinal novocain.

Field prepared with iodine and alcohol. Trendelenburg position. Bladder previously distended with potassium permanganate solution.

Midline suprapubic incision, approaching bladder in usual manner, without injuring peritoneum. Bladder of normal thickness; opened in midline to highest point. The bladder cavity was normal except for some trabeculation of the muscle wall. The bladder outlet showed a pouting, protruding, rounded obstruction on the left side of the sphincter margin and encroaching upon the urethral orifice, just as described in the cystoscopic note. It was soft in consistency and the mucosa covering it was normal. While it did not have a pedicle, it felt as though it were quite well demarcated from the rest of the prostate. Bladder outlet otherwise normal. The total enlargement was perhaps 2 cm. long in the anteroposterior direction along the left sphincter border, and 1 cm. wide. A small needle with syringe attached was introduced into the mass and about 3/10 of a cc. of thin milky fluid was aspirated. This caused the mass to disappear almost completely. Careful palpation had found no induration and nothing to suggest malignant new growth. The top of the apparent cyst was then removed with the high-frequency loop electrode. A specimen taken for frozen section was reported to show only chronic inflammatory change.

On the superior medial aspect of the cyst, one or two small yellowish bodies, like nabothian cysts in the cervix, had been noted, and the biopsy specimen was taken from this region. The floor of the cyst was found to consist of thin gray, shining membrane, a portion of which was taken for section. The entire region was then carefully coagulated with superficial diathermy. A mushroom catheter, size 20, was inserted through the urethra for constant drainage, placing the button of the catheter firmly against the region of the cyst for further hemostasis. The field was left clean and dry. The bladder was closed around a large mushroom catheter at the apex, with No. 1 plain catgut continuous in two layers. The wound was washed with saline solution, and painted with two per cent mercurochrome. Closure with silkworm gut figure-of-eight stay sutures interrupted, and No. 1 chromic catgut for the rectus fascia. Cigarette drain to prevesical space; silk sutures for the skin. Sponge count correct. Patient left the operating room in good condition.

Pathological Report: Gross specimen,—a piece of fairly firm, blood-stained tissue measuring 0.8 x 0.5 x 0.5 cm., covered on one surface by epithelium. On section, pinkish-gray, finely granular, sharp cut edge. Also two very small pieces of soft blood-stained tissue. Microscopically: Sections of prostate gland in which glandular epithelium is several layers thick in foci. Interstitial tissue is infiltrated by lymphocytes in many foci.

Final Diagnosis: Cyst of prostate and chronic prostatitis.

The surgical convalescence was very satisfactory, being complicated only by a mild pyelitis. The patient left the hospital in good condition on August 19, 1932. He was last seen in the Out-Patient clinic on November 9, 1932, at which time there was no complaint of bladder disturbance. Cystoscopic inspection found the bladder picture to be entirely negative and the contour of the vesical outlet normal.

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METAPLASIA IN THE PENIS: THE PRESENCE OF BONE, BONE MARROW AND CARTILAGE IN THE GLANS*

BY VINCENT VERMOOTEN, M.D.†

ACCORDING to Jacoby[3] most species of mammals can be recognized by the shape and size of their os penis which is apparently pathognomonic for each group. The chimpanzee, being nearest akin to homo sapiens is devoid of any os penis except for a small piece in the glans.

In man, except for the rare instances in which ossification is found to have taken place in individuals suffering from plastic induration of the penis (Peyronie's disease), there is no os penis.

That ossification does take place in cases of "induratio penis plastica" is well known and

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is very obvious when one sees the accompanying illustration (fig. I) of Rokitansky and Demarquay's case in which practically all the previous fibrosis has undergone ossification. Chetwood[1] and Erdman[2] reported similar instances of extensive ossification of the sheath and septum of the corpora cavernosa.

Except in the chimpanzee, ossification in the glans penis is apparently a very rare occurrence. So far we have been unable to find any human case reported in the literature. The following is therefore a curiosity.

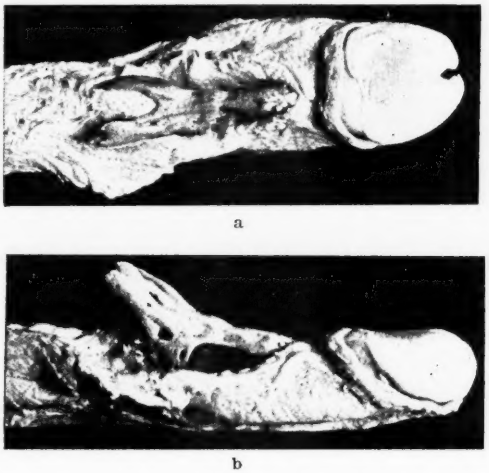

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FIG. I. Illustration from Henke and Lubarsch's Handbuch der Speziellen Pathologischen Anatomie und Histologie, Vol. VI, part III, Julius Springer, Berlin 1931, showing extensive ossification in Rokitansky and Demarquay's case of induratio penis plastica (Peyronie's disease).

CASE REPORT

F. M., aged nineteen, was admitted to the Urologic Service of the New Haven Hospital on October 25, 1932 on account of the presence of a lump in the glans penis.

July 29, 1932 a revolver bullet (.38 Wesson) entered his left buttock, emerged on the inner aspect of the thigh, then passed through the scrotum, the shaft of the penis and, so far as the patient knows, became lodged in the left half of the glans penis. At the time of injury he was treated in the Bridgeport Hospital where, on examination, it was found that he had a small penetrating wound on the posterior part of the left buttock, medial and inferior to the ischial tuberosity. Anteriorly, there was a point of exit in the thigh lateral to the inguinal fold. At the base of the scrotum there was a small wound. There was also a penetrating wound through the midshaft of the penis (apparently not involving the urethra) as well as another through the anterior portion of the glans penis. There was no evidence of bone or nerve injury. The wounds were cleaned, irrigated and drained. They were all healed in two weeks.

When he was seen on October 25, 1932, almost three months after having been shot, the scars of the previous injury were seen to be well healed. There was a very hard, well-defined mass in the left half of the glans penis, located on the dorsum and just in front of the coronal sulcus. This could readily be felt and, as the patient himself believed, was thought to be part of the steel jacket of the bullet. It did not involve the urethra.

Radiographic examination (Fig. II) showed a foreign body which had the outline of a piece of shrapnel, while the density of the shadow cast was not that of steel or lead, but strangely enough had the general architecture of cancellous bone.

Operation. Under gas-oxygen anesthesia the foreign body was cut down upon and was found to be composed of a structure which seemed to be bone and cartilage. It was removed piecemeal and after complete excision the wound was closed with mattress sutures of double zero chromic catgut in which way the bleeding was readily controlled.

FIG. II. Radiogram of penis showing cancellous bone in the glans.

Microscopic examination of the tissue removed (Fig. III) showed it to be made up of bone within which bone marrow could be seen. Cartilage, as well as cavernous tissue with a considerable amount of hyalinizing fibrous connective tissue was also present.

Reëxamination of the patient on February 17, 1933, almost four months after excision of the metaplastic mass revealed the presence of some induration at the site of operation while radiographically there was no evidence of any recurrence of bone.

FIG. III. Photomicrograph of tissue removed from the glans penis. Note the bone marrow within the area of bone at the right hand side of the illustration as well as the cavernous tissue at the upper right hand corner. The remainder of the photomicrograph shows more bone, cartilage, and much hyalinizing fibrous connective tissue.

The site of the island of bone was that of the former injury to the glans penis. It is pre-

sumed that, in the fibrosis resulting from this injury, ossification had taken place. Why this should have occurred here and nowhere else is hard to say. There was no injury to bone so that there could be no direct transplantation of bone tissue. The patient's blood calcium was 10.20 mgm. per 100 cc. and his blood phosphorus was 3.98 mgm. per 100 cc. Both of these are perfectly normal.

As in myositis ossificans there was definite injury to tissue but the injury was not oft-repeated and there was no evidence, even on microscopic examination, of any inflammatory process.

SUMMARY

A case of metaplasia in the form of bone formation with bone marrow and cartilage in the glans penis following a pistol shot wound is reported.

In conclusion I wish to thank the authorities of the Bridgeport Hospital, Bridgeport, Connecticut, for their kindness in supplying me with the details of the patient's original injury and treatment.

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DR. GEORGE G. SMITH, Boston: As is evidenced by our very good attendance this evening, we are unusually fortunate in having with us tonight Dr. Young. Dr. Young was born in Texas, educated at the University of Virginia and Johns Hopkins and spent a year in pathological training and since 1895 has been associated with the Department of Urology in Johns Hopkins where he is now clinical professor. Further words of introduction are unnecessary. We all appreciate the work which Dr. Young has done; there is hardly a subject in Urology, if one reads the literature carefully, in which we do not find evidence of his ingenuity, his brilliant technique and his thoughtfulness. He comes to us tonight with a subject which at first rather excites one's tendency to smile, but which I am sure we will find is very full of interest. Probably no one of us has seen more than one or two hermaphrodites but I am sure Dr. Young is going to talk about a great many more than that. I feel certain it will be an interesting talk.

SOME HERMAPHRODITES I HAVE MET*

BY HUGH H. YOUNG, M.D.†

THE subject of hermaphroditism has interested not only doctors, but also the laity since time immemorial. In the earliest writings there have been references to such creatures, and the museums of Athens, Rome, Madrid and Paris contain excellent examples of hermaphrodites done in lovely marble by the great sculptors of antiquity. The literature is overwhelming, and the list of authors contains many of the greatest of antiquity and of modern times.

My first case was that of G. S. (B. U. I. 1466) whom I encountered about twenty years ago. "He" was reared as a girl in Austria. At the age of fourteen "he" decided he was a boy, put on trousers and ran away from home. Shortly afterwards the patient married a woman, but his feminine partner was evidently not satisfied, because she left him shortly. Several years later, as he knew he had a vagina, he put on skirts again, and married a husky male. But in a short time they separated. After that the patient had coitus frequently as a male, and just as often as a female. He asserts that they were equally and definitely satisfactory. At the age of fourteen menstruation occurred through the urethra, and subsequently also there was vicarious menstruation from the nose.

When seen by me, he was forty-six years of age, menstruation had ceased, but "he" continued to lead a double life. As seen in the accompanying photograph (fig. 1), the body configuration was that of a woman. The absence of hair on the face, the pronounced mammary development, etc., suggested a female. There was a short penis; no testes were palpable (they were thought to be undescended). A small, short pseudo-vagina was present, but no uterus was palpable. On endoscopic examination the vagina was found to open in the floor of the urethra, and a probe passed at least three inches into it, possibly entering the uterus. Neither prostate, nor uterus, tubes or ovaries could be definitely made out. The patient refused operation, and passed from view.

*A brief condensation of a lantern slide lecture on a series of true hermaphrodites and pseudohermaphrodites, who have been examined at the James Buchanan Brady Urological Institute, Johns Hopkins Hospital, Baltimore.

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The second case (B. U. I. 18386) is that of a male, aged 40 years, who complained of undeveloped sexual organs, and who had never had any sexual desire, nor coitus with the opposite sex. Two years ago the breasts began to enlarge, and have become so pronounced that he wishes them removed. Penis small, 4 cm. long, testes about normal in

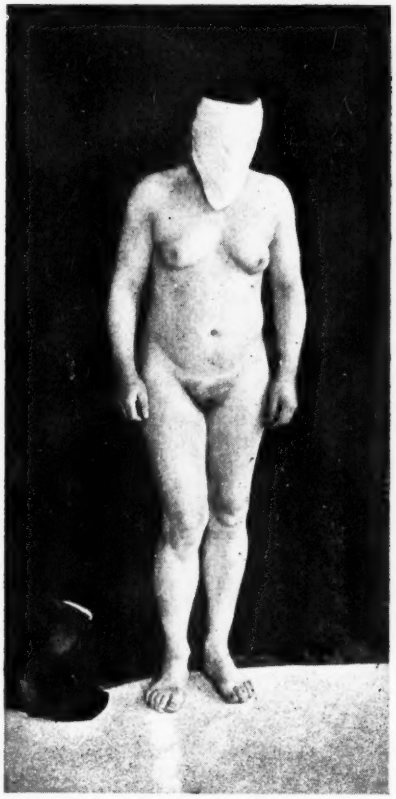

FIGURE 1. Case 1. Patient reared as a girl; decided to be a man at age of 14; subsequently married, and enjoyed sexual life both as a male and a female. B. U. I. 1466.

size, epididymes and vasa negative. Prostate and vesicles not made out. On laparotomy no female generative organs were found. At the patient's urgent request, operation was done to remove the breasts. He died from pulmonary embolism, and autopsy showed no female generative organs.

My third case (B. U. I. 9692) was 34 years old, single, complained of a very small penis and testes, no desire or erections. He had attempted coitus. There was no beard, breasts were markedly developed, body contour female, penis was very small and testes only 1 cm. in diameter, but with a minute epididymis and a vas on each side. Prostate and vesicles could not be made out. Voice high and thin. He stated that erections occurred, and that he had indulged in masturbation, that his feelings were entirely masculine, but that he had never succeeded in carrying out intercourse. He demanded implantation of testes. As one of my assistants at that time was a physician to the penitentiary, we were able to secure normal testes from a young man. One of these was inserted into the scrotum, and the other (in slices) into the recti muscles in various places, by Dr. Colston. The wounds healed well, and before the patient left, he seemed to have marked stimulation of his sexual desire. When seen a year later he was in high glee, asserted that he had just come back from Havana, whither he had been accompanied by a charming blond, with whom he had had very active and satisfactory sexual experiences. He strongly asserted that he felt like a real man. When seen three years later, however, he was again despondent. His libido, erections and potentia had disappeared. Hope was gone, and he again slunk around, avoiding the gaze of normal men.

The fourth case (B. U. I. 12500), male, aged 34 years, was small, but masculine in appearance. Fig. 2 shows the external genitalia. The left scrotum showed hypospadiac phallus, with a testis on each

FIGURE 2. Case 4. Cleft scrotum held apart, showing a hypospadiac, diminutive, curved and adherent penis. Urinary meatus and opening of vagina several inches in length. B. U. I. 12500.

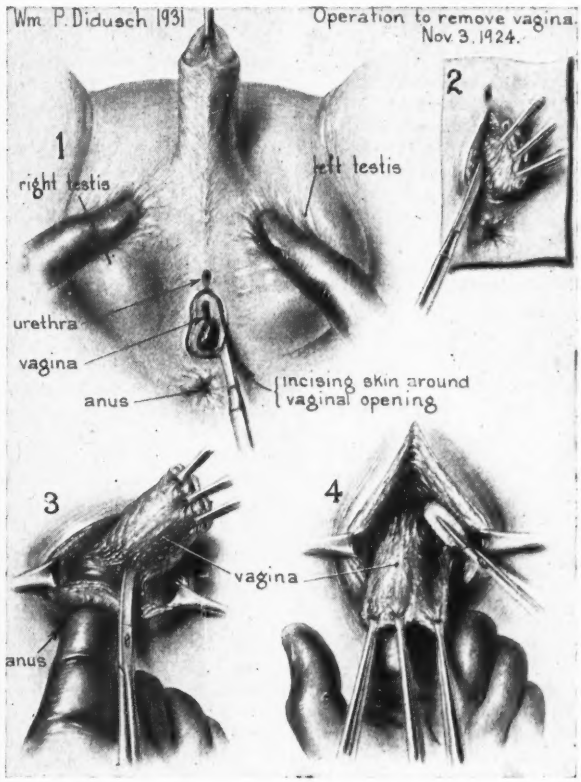

FIGURE 3. Case 4. Operation to remove vagina from a male with hypospadias. B. U. I. 12500.

side, and an opening in the urethra, perineal urinary meatus, and a vagina which was about the length of the finger. Examination showed no evidence of uterus, although a tubular structure could be felt. Plastic operations (fig. 3) were carried out to remove the vagina, to straighten the penis and eventually cure the hypospadias. These were entirely satisfactory, and when the cleft scrotum was removed and the two sides brought together, the appearance was quite normal. The patient afterwards married, and is now living with entire satisfaction to his wife. Examination of the tissue removed with the vagina showed a definite Fallopian tube. It is possible that an ovary may have been present, but until found, the patient must be classed as pseudohermaphrotismus masculinus.

Case 5 (B. U. I. 12513) was eighteen years old on admission. Until two weeks previous to observation this patient lived as a girl, but doubted the true sex, demanded an examination, and was sent here. There was a slight beard, body of masculine appearance, hypospadiac penis, cleft scrotum, with testes present, pseudo labia and large vagina. On rectal examination indefinite bodies in pelvis, which may be rudimentary female sex organs, were found. Operation: The vagina was excised, and hypospadias cured by plastic operations. The patient married and leads a successful sexual life.

Case 6 (B. U. I. 9222), 20 years of age, reared as a female attended a fashionable girls' school until eighteen years of age, finally doubted the sex, because "I was having relations with eight fellow students." Patient left school, assumed male attire two weeks before admission here. Testes partially descended. No vagina. Operations to cure hypospadias successful. Patient married his hospital nurse; intercourse reported satisfactory to both.

Case 7 (B. U. I. 16273), aged 13 years, reared as a male, well-developed hypospadiac penis, erections present, male chest and pelvis, fully descended testes, cleft scrotum, female labia, urethra and a vagina three inches long. No internal female organs discovered. Operation to remove vagina and make urethra successful. Study of the tissue removed with vagina showed Fallopian tube. It is possible that an ovary may have been present, but it was not discovered. Diagnosis: possibly hermaphroditismus verus, not proved.

Case 8 (B. U. I. 4422), aged 10 years, brought up as a boy, hair on face, chest, breasts, pelvis and thighs. Hypospadiac phallus, labia majora, no testes found. Perineal opening of urethra, female in type. Exploratory abdominal examination revealed a well-formed tube, uterus and ovary. No spermatic cords were found in the inguinal canal. One tube and ovary excised for examination which showed normal female histology. As the patient's family insisted on rearing patient as a boy, although told that the patient was entirely female, an operation to furnish the phallus with a urethra was carried out. The patient is still wearing masculine attire (fifteen years later).

Case 9 was seen by me with Dr. Thomas Cullen. The patient was a seamstress, who came in with a strangulated hernia. There was a heavy, black beard which required daily shaving, a masculine body, a phallus without urethra several inches long, a vagina, a swelling in the right groin, which at operation was found to contain a strangulated intestine, and a normal testis, which was removed. The patient's family refused to have her told she was a man, and now after twenty-five years, she is still wearing skirts and is an excellent seamstress.

Case 10 (B. U. I. 14127), reared as a boy, living at an orphanage for boys. Examination showed a masculine body, small hypospadiac phallus, labia with a small vagina, no testes discoverable. Preoperative diagnosis: male, with undescended testes. Operation: an exploratory laparotomy was performed with discovery of a uterus, Fallopian tube, and left ovary. Neither ovary nor testicle found on right side. No male generative organs discovered. The custodian was notified of the true sex, and the child put in girls' clothing and sent to a female orphanage. There she developed a marked habit of masturbation, the supposed clitoris having become quite large. At the urgent request of the authorities, this was amputated. The child is now about fifteen years of age almost six feet tall, characteristics entirely male, joins boys at football and baseball whenever possible, undoubtedly male in characteristics. The case is possibly hermaphroditismus verus, but not proved.

Case 11. The patient was reared as a female. At the age of eighteen this person was in love with a man and demanded amputation of an enlarged clitoris and the cure of two inguinal herniae. (See Fig. 4.) Operation elsewhere under

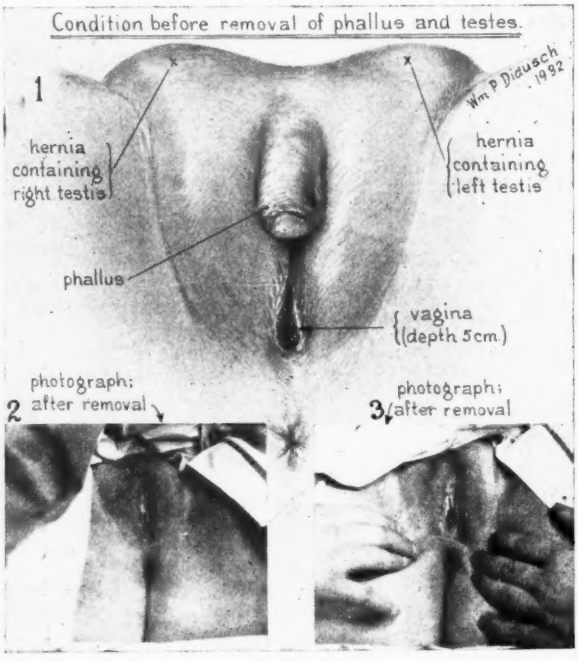

FIGURE 4. Case 11. Conditions before and after operation: small vagina, absence of labia, testes retained in groins, hypospadiac penis, as shown in No. 2. Nos. 2 and 3 show the condition after removal of penis and testes.

novocain. The phallus was amputated. Incisions made in the groins revealed normal testicles. The patient was notified of the condition and strongly asserted that she did not wish to be a man, but intended to marry as a female, because she had a vagina and ordered the surgeon to remove the testicles. As the phallus had already been amputated, this was done. Figure 5 shows the specimen which was removed. At the upper end of both testes, fimbriated tubes were found. Examination of the abdominal organs was negative. The patient married, but separated from her husband in two years although asserting that sexual intercourse

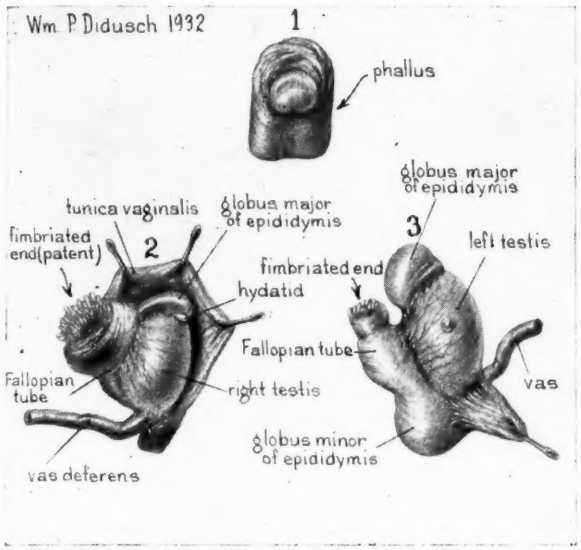

FIGURE 5. Case 11. No. 1, phallus (hypospadiac penis) removed at operation; Nos. 2 and 3, testes, epididymes and attached portions of Fallopian tubes with fimbriated ends also removed at operation, in a case in which a vagina was present, and the patient insisted on having all male attributes removed.

was satisfactory to both. Four years later the patient was seen by Drs. Moore and Wharton, and demanded a lengthening of the vagina. This was carried out successfully by Dr. Wharton, who, using a condom filled with paraffin, which was left in place for three weeks, obtained a vagina six inches long as seen in figure 6. The patient then married and is apparently living happily as a woman, although probably a man. It is not certain that ovaries may not be present and accountable for feminine characteristics.

Case 12 (B. U. I. 7069), 24 years of age, reared as a male, less hair on face and body than normal. Shape of body and appearance of mammae masculine in type. Erections and desire normal. Hypospadias with urinary meatus at peno-scrotal junction. No testes or cords. No labia or vagina. Operation to cure hypospadias. The patient died in the hospital from influenza. Autopsy showed on right side in the region of the kidney a structure which resembled an ovary, but proved microscopically to be a testis. No epididymis. No ovary or testis on the opposite side. The vas deferens, running down from the testis, communicated with a long sac about the size of a little finger, which entered the urethra through the verumontanum (utricle). No prostate or seminal vesicles found. Sex male.

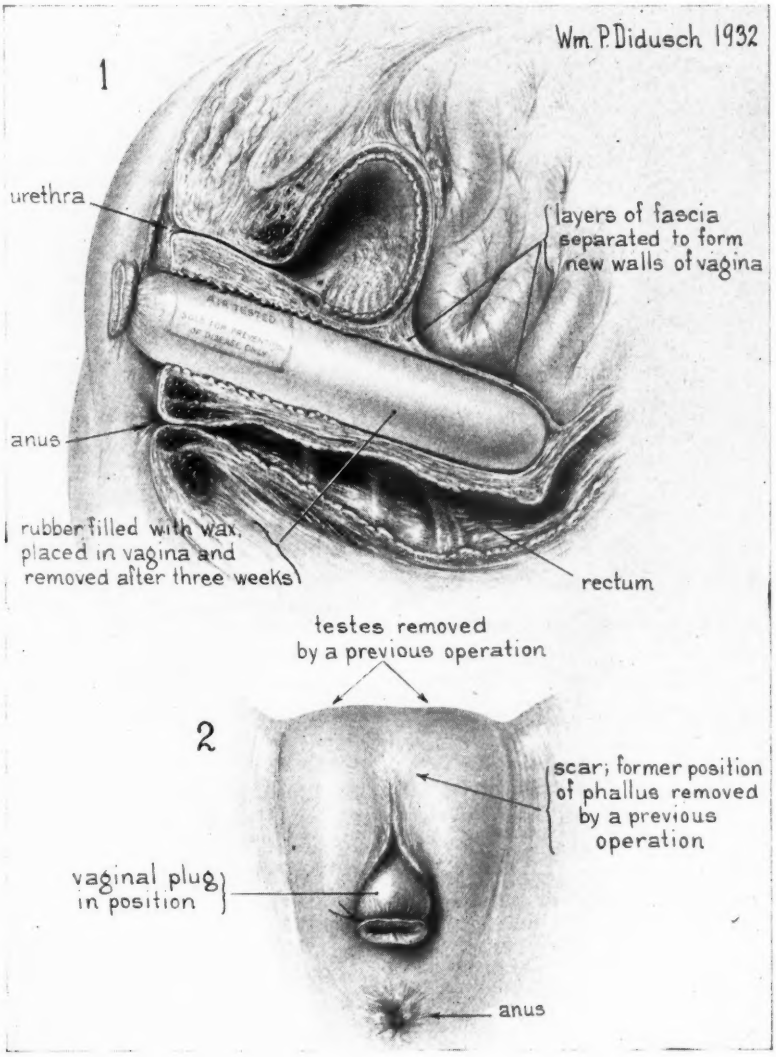
Wm. P. Didusch 1932
1
urethra
layers of fascia separated to form new walls of vagina
anus
rubber filled with wax, placed in vagina and removed after three weeks
rectum
testes removed by a previous operation
2
scar; former position of phallus removed by a previous operation
vaginal plug in position
anus

FIGURE 6. Case 11. The depth of the vagina has been greatly increased by incision and blunt dissection between two layers of fascia. A rubber tube filled with paraffin has been introduced. This was held in place by a bandage for three weeks, after which the epithelium was found to have completely covered the dome of the vagina, which was then six inches in length.

Case 13. (B. U. I. 12521.) Boy of 11 years who had been reared as a male. Several operations for hypospadias. No testes present. Operation was done to bring down testes. On left side, within a hernial sac, a small but definite uterus with a well-developed tube, and a round body, supposed to be an ovary, was found. On left side a testicle and small Fallopian tube adjacent. No epididymis and no vas. Section was removed from the testis for microscopic study. The testis was then brought outside and fastened in the groin. The uterus, tube and the supposed ovary were removed. Microscopic examination showed the supposed ovary to be a testis. No ovary was therefore found present. The patient has now been followed three years. The testicle, which was brought down, has atrophied almost completely, and the patient is becoming fatter and more feminine in appearance. It would seem that an artificial Froehlich's disease had unfortunately been produced by section of the testicle, which probably led to atrophy.

Case 14 (B. U. I. 12181), a true hermaphrodite, the twelfth on record in the world's literature. A young man, then attending a boys' school, where he had shown marked athletic ability. He is almost six feet tall, and very strong. He is entirely masculine in appearance (fig. 7). There is a large

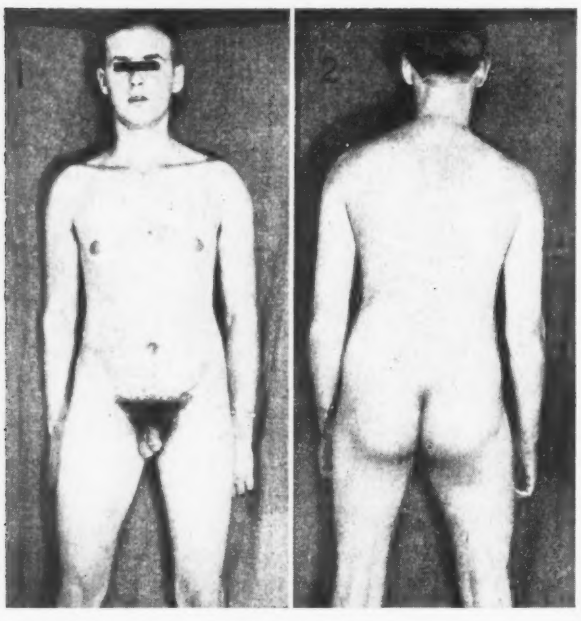

FIGURE 7. Case 14. Photographs, front and rear, of apparent male, with large right testis, hypospadiac penis, no testis on left side. Discovery at operation of a large functioning ovary, tube and uterus on left side. A true hermaphrodite. B. U. I. 12181.

penis without a urethra, a well-developed testis in right side of scrotum. The left testis is undescended, a mass palpable in the upper part of the canal. Rectal examination failed to show any evidence of female organs. An operation designed to bring a left testicle was done. Incision revealed a sac in the left inguinal region, which when opened was found to contain a fairly well-developed uterus, a tube four inches long, an ovary normal in size and function, as shown by Graafian follicles in various forms of development. One had recently ruptured. Previously ruptured follicles were visible. As a large group of the hospital staff had assembled, it was voted that the patient was probably female, and that the right scrotal sac should be opened, where an ovary might be expected. When opened a testicle with abnormal epididymis and no vas deferens was discovered. Section taken showed definite testis. Figure 8 shows condition found on operation. On another vote of the as-

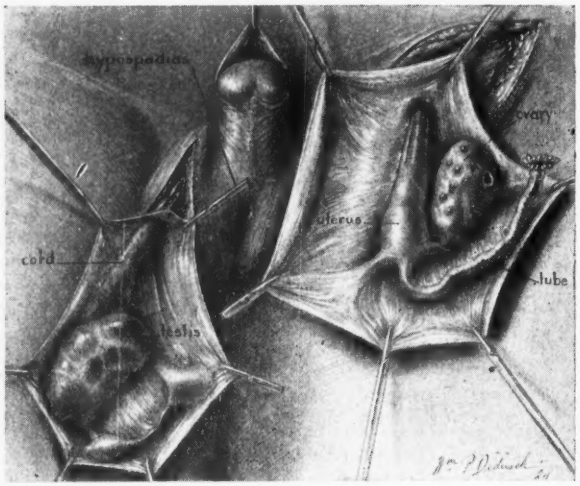

FIGURE 8. Case 14. Showing the hypospadiac penis, the testis with abnormal epididymis and no vas deferens on the right side; large functioning ovary, tube and uterus on the left side. A true hermaphrodite. B. U. I. 12181.

sembled staff, it was decided to remove the female organs. These proved to be a normal uterus, tube and a functioning ovary. Subsequently a complete urethra was made, and the patient married a charming woman with whom he is living happily.

Cases No. 4, 5, 6, 8 and 14 have been described in detail in Young's Practice of Urology, vol. ii, 121-133. (W. B. Saunders Company, 1926, Philadelphia.)

Dr. Young completed his lecture by a brief discussion of the embryology and various aspects of the problem, but space forbids insertion here.

Discussion of Dr. Young's Paper

Dr. Quinby: I am afraid I cannot add anything to what Dr. Young has said. I have enjoyed hearing his exposition very much but the subject is really very complex. Almost any aberration can occur. Dr. Young has shown us many of them but Wagebauer in the literature has covered even more numerous vagaries of the composition of the genitalia than would fall to the lot of any one individual, even with Dr. Young's extensive experience. It is exceedingly hard to decide what action one should take as a physician when confronted with an individual of this sort, and it is probably a matter which will be decided, in the last analysis, according to the characteristics of the individual. It is manifestly impossible to transform the external characteristics and the whole habitus of living of such a person. One of the type such as Dr. Young has presented tonight, I remember recently. He also had been eventually dismissed from a girls' school at about the age of 18 and I was more or less influential in fighting his life battle for him during the next three and a half years. He had a very difficult time in adapting himself to his changed environment and his true sex. It probably would have been

better to have actually sterilized the individual and let him go along as a girl. It made a great deal of commotion, embarrassed his family, annoyed all of his acquaintances suddenly to discover that a mistake had been made for some 18 years and it embarrassed the individual himself even more. He felt the complete pariah, having no distinctive sex and not knowing whether he was able to vote when he was 21 or whether they would accept him in the Registry. It was a perfectly pathetic situation. He eventually solved it, his family being people of means, by moving from this country, living in France for a considerable period as a boy, very manfully taking up his new problem of life so that his existence would not be that of the fan coquette but the "go-get-him-and-hit-him-in-the-nose" type.

Another individual has chosen his life work in a hazardous occupation for a similar reason, one who was supposed to be a boy but was found on examination before operation to be what was suspected as a cryptorchid with a hypospadiac penis. On coming to the hospital because of acute fever, pain and discomfort in the pelvis, a mass was found filling the whole true pelvis. The case was reported by a previous resident of ours, Dr. Middleton, here at this society a year or two ago. The preoperative diagnosis was a tumor or an undescended testicle, partially filling the true pelvis. At laparotomy, however, the tumor was found not to be a neoplasm of an undescended testicle but a uterus full of pus,—a pyometra, the uterus emptying at the utricle in the prostatic urethra, a perfectly good testicle on one side and a rudimentary affair, whether testicle or ovary I do not know, on the other side. That individual again had to more or less reconstruct his ideas of life and he went into aviation. As a matter of fact, he is a very good aviator.

These things are all very complex problems. The pathological reasons underlying the matter are entirely obscure. At present we are just beginning to get glimpses of the mechanism by which such conditions occur. We must distinguish I think, in discussing them, between an aberration of the actual sex organs, that is, of the gonad itself, and the accessory organs of sex, uterus, muellerian ducts, tubes and vasa deferentia. We must distinguish between a mixture of abnormal development of the gonad and the secondary sex characteristics by which we are known as male or female, because the secondary sex characteristics, that is, change in the voice, the character of the breasts or character of the skeleton are by no means consistent in these individuals with the predominant gonadal character.

There is a still further aberration of secondary sex characteristics rather frequently, a result probably, so far as we can guess at it today, of some abnormality of hormonal control, pituitary, adrenal, sex gland, etc., the interactions of which we can only guess.

I am sure we have all been exceedingly interested in Dr. Young's presentation.

DR. SMITH: I think Dr. Quinby has suggested a very interesting thing when he says that we have just begun to get inklings of what lies behind these developmental anomalies. I have been reading a book on heredity lately which goes quite thoroughly into the modern views as to the transmission of characteristics. It has been found very definitely that sex is determined by the absence of one chromosome in the male, that is, the male is minus one chromosome in the human race. Each chromosome has been found to contain within it a large number of genes and these are concerned apparently with the transmission of various characteristics. The subject has been studied in the fruit fly where mutations can be produced by radiation with x-ray and it has been found that various grades of sex can be produced, for instance, ranging from super-female down through the grades to neuter, out into the male and to the super-male and I suppose it is possible that this condition which Dr. Young has described may be due to some mutation in the chromosome of the parents which has resulted in an abnormal development of the sexual elements in the child. I think probably a good deal more will be discovered about that now that the road has been opened up to the study of these very interesting phenomena.

DR. J. E. KERNEY, Providence, R. I.: I recall, in 1914, a case coming into the Hopkins Clinic because of swelling in the groin. This was a pseudo-hermaphrodite and was a case of epididymitis in an undescended testicle. I believe Dr. Young will recall that.

DR. BENEDICT F. BOLAND, Boston: I would like to ask what the character of the menstruation was, if any.

DR. YOUNG: In regard to menstruation in the two or three cases reported I never actually saw it so I cannot answer that. Apparently it was very indefinite. Sometimes the amount was fairly large and sometimes very small, sometimes so small that it would occur during urination and at other times there would be an evacuation of a large amount of blood. One of these individuals had epistaxis about the same time he was having discharge of blood from the urethra. Most of these cases did not have menstruation. Apparently the internal organs do not connect up and there is no chance for any menstruation to come out. The young man, the last one I showed, who was a true hermaphrodite, had a functioning ovary. There was no evidence of menstruation of any sort and there was no change in him periodically that would enable us to make out that he went through any cycle. But it was very evident that he had had a number of ruptures of graafian follicles occur in the past, as was shown by the scarred condition of the ovary. The whole subject of menstruation is very indefinite.

ANAL FISTULA*

BY E. PARKER HAYDEN, M.D.†

THE history of medicine reveals few pathologic conditions the true nature and rational treatment of which were appreciated earlier than in the case of anal fistula! To be sure the methods of treatment were crude, probably quite painful, and undoubtedly often unsuccessful, yet they were well conceived and did produce many cures. A brief reference to fistula is found in the Code of Hammurabi (Longacre[2]) in the Twentieth Century B.C. Hippocrates, in the Fourth Century B.C., wrote as follows: "The frequent exercise of either riding or rowing occasions a contusion of the soft parts surrounding the anus, which, producing an accumulation of blood, is the origin of the fistula. If a tubercle appears it should be opened before matter is formed, that the intestine may not be injured by its coming to suppuration. But if there is already a fistula, the depth of it is to be ascertained by probing it with a stem of garlick. The primae viae must be cleansed, and afterwards the following method pursued; twist round a five-fold strand of very slender raw linen some horsehair, that it may not decay; and by means of a pewter probe thrust it into the fistula; at the same time put the second finger of the left hand into the anus, and when it has reached the head of the probe, which ought to be for that purpose a little bent that way, lay hold of one end of the linen and draw the needle down with the other. The remaining part of the treatment consists in tying the two ends of the string close to the anus, and in tightening the knot every day until the fistula is entirely destroyed. Afterwards, when the fistula has sloughed through, a good deal of burnt verdigris mixed with very small bits of sponge is to be thrown up by means of the probe. This dressing is to be repeated every day taking care to wash the parts well every time after the injection. A sponge covered with honey ought to be introduced, in order to prevent a coalition of the parts before they are entirely sound. For, in this way, the fistula being forcibly expanded by the sponge will not fill up and heal unequally, but it will all become whole together. If this method should prove insufficient it is advisable to make use of the knife, for when the fistula does not get eaten through, having first examined it with a sound, cut down as far as it passes."

Celsus, four hundred years later, advised the use of both scalpel and ligature, the former to open the main sinus and the ligatures to be used in the side tracts. He pointed out the dangers of incising to a high internal opening, and used a tent in such cases.

Paulus Aegineta, one thousand years after Hippocrates, probed the fistula, pulling the end of the probe out of the anus and cutting down on the sinus. He did not use ligatures.

John Arderne, in the Fourteenth Century A.D., wrote several works on surgery, which have been collected and edited by Sir D'Arcy Power. Arderne was the first writer to give a list of fistula cases cured, and he was not averse to tackling complicated ones. He cured "one that was called Thomas Broune, that had fifteen holes, eight on one side and seven on the other, by which Wynde went out with egestious odour". Some of the holes were distant from the anus "by the span of a hand-brede of a man".

Heister of Helmstadt, in the Eighteenth Century, published an excellent work on surgery, translated into English in 1743. His description of fistulae is quite comprehensive and he classifies them as complete and incomplete, simple and compound, and blind or occult. Incision is advocated, and the use of milk in tracing the sinus opening is recommended. Heister quotes from Dionis, who says "the French were so fond and proud of being in the Fashion, when their King Louis XIV had a Fistula, that they boasted of the Disorder as a point of Honour, and would even undergo the Operation when there was no real necessity".

I have in my possession a book entitled "Primitive Physick: or an Easy and Natural Method of curing most Diseases", written by John Wesley in 1765 and from which the accompanying section on *Fistula* is reproduced. (Fig. 1.) Undoubtedly many sufferers from the disease devoured these words and faithfully followed out Wesley's formula in the hope of avoiding the surgeon's knife. There is no doubt but that some fistulae did heal, at least temporarily, just as a certain number heal nowadays without surgical aid. And yet we know that the only sure way to cure a fistula permanently is to deal with it by an adequate surgical operation and follow it on to complete healing. This study was undertaken in an effort to get the details on a ten-year group of cases and to ascertain what factors contributed to the successful and to the unsuccessful results.

ANALYSIS OF 388 CASES

During the ten years, 1921 to 1930 inclusive, there were admitted to the Massachusetts General Hospital 388 patients with anal fistula. Some entered on more than one occasion, and

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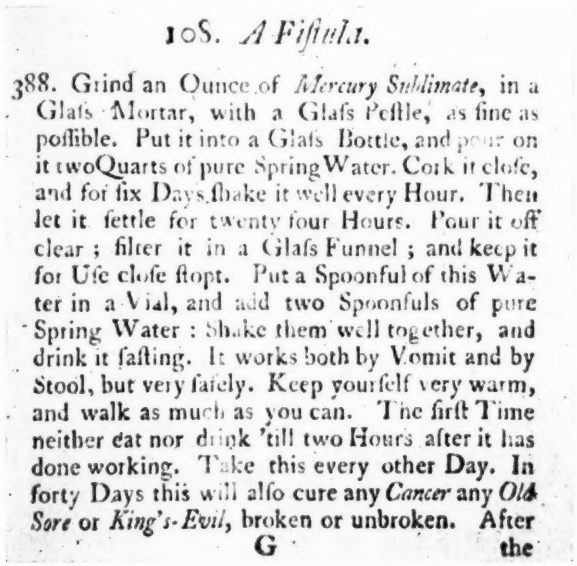
were operated upon more than once. It has been possible to trace 280 of these cases, whereas the remaining 108 have disappeared. Many were foreign born and changed their residence frequently. Of the 280 followed cases, 37 have died since discharge from the hospital. Inas-



108. *A Fiſtula.*

388. Grind an Ounce of *Mercury Sublimate*, in a Glaſs Mortar, with a Glaſs Peſtle, as fine as poſſible. Put it into a Glaſs Bottle, and pour on it two Quarts of pure Spring Water. Cork it cloſe, and for ſix Days ſhake it well every Hour. Then let it ſettle for twenty four Hours. Pour it off clear; filter it in a Glaſs Funnel; and keep it for Uſe cloſe ſtopt. Put a Spoonful of this Water in a Vial, and add two Spoonfuls of pure Spring Water: Shake them well together, and drink it faſting. It works both by Vomit and by Stool, but very ſafely. Keep yourſelf very warm, and walk as much as you can. The firſt Time neither eat nor drink 'till two Hours after it has done working. Take this every other Day. In forty Days this will alſo cure any *Cancer* any *Old Sore* or *King's-Evil*, broken or unbroken. After

G the

FIGURE 1

much as their deaths were not a result of the presence of the fistula, or of an operation for its cure, these cases will be discussed later in connection with the end results as a whole.

TABLE 1

CASES OF ANAL FISTULA

(Massachusetts General Hospital 1921-1930)

Untraced	108
Traced (37 dead, 243 alive)	280
Total	388

SEX

The ratio of males to females in the series is roughly 3 to 1. Buie[3], in his series of 1000 cases, found a ratio of about 3 to 2 (58.9% to 41.1%). One might suppose that, in view of the increased tendency to constipation and greater use of cathartics and enemas by women in general, the incidence of fistula would be greater among females, but such is apparently not the case. The predilection for males may lie in the fact that men in general get away from home hurriedly in the morning, often postponing bowel movement until later in the day, make use of varied and often crude toilet facilities, are more averse to the use of enemas, oil, etc., even when indicated, and in many cases spend their day either in hard physical labor, or in sitting down in an office with complete absence of any physical labor or exercise.

TABLE 2

SEX DISTRIBUTION

Males	285	(73.4%)
Females	103	(26.6%)
Total	388	

AGE

Age incidence, as shown in Table 3, discloses the fact that the great majority of cases (90.7%) occurs between the ages of 20 and 60. In the series reported by Buie, 93.9 per cent of the patients are within the same age group. This is mentioned simply to show how closely the percentages compare, and not because of any particular significance attached to the fact.

TABLE 3

AGE INCIDENCE

Age	*Number of Cases*	
Under 10	3	
10-20	9	
20-30	73	
30-40	100	
40-50	111	(90.7%)
50-60	68	
60-70	20	
Over 70	4	
Total	388	

DURATION OF DISEASE PRIOR TO ADMISSION

Approximately one third of the 388 patients came to the hospital within six months of onset of symptoms, whereas two thirds delayed for a longer period. In many cases recurring abscesses had been incised or had ruptured during this interval, while in other instances the patient had had, since the initial abscess, little or no trouble other than the discomfort of constant or intermittent drainage. In a few cases the initial abscess had promptly healed and only recently reopened.

TABLE 4

DURATION OF DISEASE

Time	Number of Cases
Under 6 months	126
6 months to 1 year	50
1 year to 2 years	55
2 years to 5 years	76
Over 5 years	75
Unknown	6
Total	388

ETIOLOGY

There would seem to be little room for argument as to the fact that in most instances an anal fistula is the end result of the shrinking down of the cavity of a perianal or perirectal abscess produced by one or more of the common

pyogenic bacteria always found in the anus and rectum. That the abscess itself is a product of infection introduced from *within* the anal canal, usually by way of the crypts of Morgagni, and incited by trauma to the crypts and overlying papillae, the following facts present strong testimony.

1. The crypts of Morgagni, blind pockets in the wall of the anal canal, are open only at their upper end. The papillae between the crypts likewise point up the canal. Both are therefore open to injury from hard bowel material moving downward.
2. Crypts may often be seen to be torn, tender, and red, and papillae edematous—evidences of local infection—the result of trauma.
3. The internal openings of most fistulae are to be found in the depths of a crypt or at that level in the anal canal.

Tuberculosis is *not* the important etiological factor in the production of anal fistulae that it was thought to be a few years ago. It is unfortunate, from a statistical standpoint, that, in 307 of these 388 cases, no pathologic section from the fistulous tracts was obtained. Of the 81 cases in which an examination was made, only two specimens were reported as tuberculosis (2.4% of those examined). (See Table 5.)

It is of interest, however, that 34 of the 388 patients (8.7%) had had tuberculosis in some form, either previously or on admission. (See Table 6.) Its presence had been proved quite conclusively by the various confirmatory tests.

In Buie's[3] series of 1000 cases, 9.1 per cent were considered to have tuberculosis in the body, though not all were definite. In 22 cases a positive pathologic report was obtained.

Gabriel[4], in a series of 75 cases of fistula, found definite pulmonary tuberculosis in 13 per cent. He quotes Swinford Edwards as saying that 12 per cent of fistulous patients have phthisis, and Harrison Cripps as estimating the figure to be between 10 and 15 per cent. Gabriel investigated 30 of his cases by injection of a solution of tissue scrapings into guinea pigs, and in the entire 75 cases tissue sections were stained for the tubercle bacillus. Of the 30 inoculations, six were positive, producing generalized tuberculosis in the pig. Of these six it was possible to find the tubercle bacillus in the original tissue preparation in only one case, showing how few in number the organisms must have been. Among the 45 cases examined only by stained sections of the fistulous granulation tissue, the organisms were found in four cases (9%).

TABLE 5

PATHOLOGIC REPORTS

No specimen taken	307
Chronic inflammation	78
Tuberculosis	2
Adenocarcinoma	1
Total	388

Malignancy of the lower rectum may produce a fistula, but the diagnosis in such a case should be obvious to anyone making a rectal examination. *Gonorrhea* of the rectum may also be responsible, though this disease is not encountered often in our section of the country. I have personally dealt with only three cases. *Actinomycosis* of the rectum is rare, but may occasionally be the underlying cause of a fistula.

TABLE 6

TUBERCULOSIS ELSEWHERE IN BODY—PAST OR PRESENT

Organs involved	*No. cases*
Lungs	25
Cervical lymph glands	1
Epididymis	2
Peritoneum	2
Hip joint	3
Kidney	1
Total	34

Fistula result	*No. cases*
Healed (1 dead)	15
Unhealed (11 dead)	14
Uncertain (1 dead)	5
Total	34

Fistula pathology	*No. cases*
No operation	3
No specimen	21
Chronic inflammation	8
Tuberculosis	2
Total	34

Pin worms were demonstrated in two of the three cases under ten years of age. The two children, aged nine and three, were brothers. Their fistulae were very superficial and it seems probable that the worms, burrowing into the crypts, introduced the infection which produced the initial abscess. *Ulcerative colitis* and *typhoid* may be complicated with a fistula—an example of each occurred in this series. Fistulae may occur also in association with the ulceration in and above a *stricture,* as illustrated by two cases in the series, one of which had syphilis.

TYPES OF FISTULAE

Various classifications of anal fistulae have been suggested by different men. Most textbooks speak of blind internal, blind external, and complete fistulae according to whether there is only an internal opening, only an external one, or both.

Blind internal fistula—In this series there were nine cases of blind internal fistula. This type is characterized usually by a period of one to three days of pain within the rectum, followed by rather sudden relief of discomfort coincident with the discharge of pus from within the anal canal. The opening may close with a subsequent repetition of the above sequence of events, or it

may remain open and produce a constant discharge of greater or less degree.

Blind external fistula—This is not a true type but is produced by the temporary closure of the internal opening of a complete fistula. The term might well be abandoned as it probably serves too often as a postoperative diagnosis when the internal opening could have been found by a more careful search. Occasionally a furuncle close to the anus, and recently ruptured, exhibits a small sinus of this type but will of course heal permanently in a few days.

Complete fistula—Most cases fall under this general heading. The number of external openings may vary from one to as high as thirty or forty and even more, and the sinuses may extend widely on both buttocks, even involving the scrotum and inguinal glands. There is usually but one internal opening, as was the case in the two most extensive fistulae in this series. (Figs. 2 and 3.) On the other hand one does occasionally find more than a single internal opening. In this event they may be connected with the same fistula, in which case one will be above the other in the anal canal, or they may be openings of independent fistulae in which event they are usually at the same level but in different quadrants of the canal. Three single fistulae in the series had two internal openings, and I have operated on a case recently in which there were three openings, one above the other.

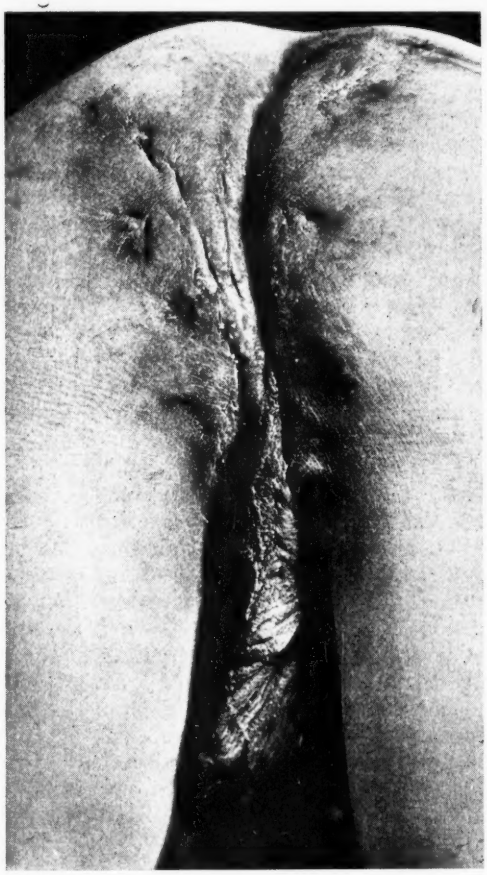


FIGURE 2. Extensive fistula involving both buttocks, the right half of the scrotum, and the right inguinal glands. There were one internal and 37 external openings. Case now cured except for one small sinus which will be incised later on.

Multiple fistulae—There were four cases of double fistula in the series. In three of them the internal and external openings of the two sinuses were directly across the anus from each other. In the fourth the two internal openings were fairly close to each other at the same level, but did not connect, and their sinuses diverged to the respective external openings.

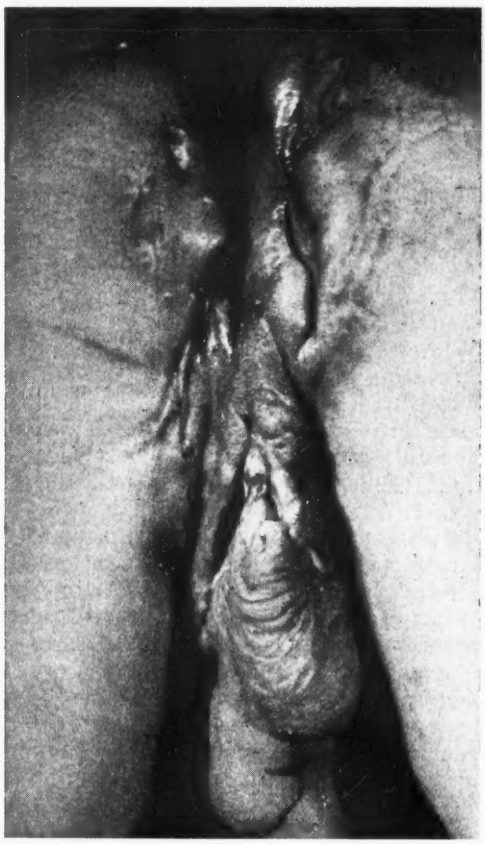


FIGURE 3. Another case similar to the one shown in figure 2. Incision and drainage has resulted in almost complete healing.

Miles' classification—An anatomic classification, based on the exact location of the original abscess, has been advanced by W. Ernest Miles[5]. He divides fistulae into six groups, in any of which may occur both complete and incomplete varieties, unilateral or bilateral. The classification is as follows—

a. Subcutaneous.
b. Submucous.
c. Intermuscular (between the muscular coats).
d. Pararectal (situated in the lymphatic sinus).
e. Subsphincteric.
f. Ischiorectal.

An understanding of the relationship, in these different types, of the fistulous tracts to the perianal and perirectal musculature is essential to an intelligent operative procedure and a good end-result. Every surgeon operating on fistulae would do well to familiarize himself with Miles' paper.

ESSENTIALS OF TREATMENT OF ANAL FISTULA

It is not good surgery to attempt the cure of a fistula by methods other than a well-devised incision of the main tract to its internal opening, together with incision of all side tracts, either as a single stage or multiple stage procedure. Whether or not the scar tissue of the tracts is completely *excised* is of small importance compared with the necessity of free incision and adequate after-care to prevent bridging over between the granulating walls of the wound superficially with the creation of another sinus along the course of the original one. I believe it is desirable to curette away the unhealthy granulations lining the tracts, leaving a clean firm base on which new and healthy granulations readily develop. In this process of curetting the main tract, any tracts opening into it are quite easily brought to view by virtue of its being impossible to curette cleanly the open mouth of such a side tract. The unhealthy granulations lining it remain visible after the main tract elsewhere appears clean. This simple fact, in my experience, renders the use of colored injection solutions quite unnecessary. Indeed I have found them a nuisance as they obscure the true color of the tract, and if the internal opening is patent the solution may stain the whole rectal wall, thus obscuring the appearance of the mucous membrane.

The use of elastic ligatures, passed through the tract and tied, though a method which has undoubtedly produced cures in some single tract and superficial fistulae, is not to be recommended. It is a very uncertain method of treatment, failing to take cognizance of the frequent presence of blind offshoots from the main tract. It is sometimes useful, however, in operating upon a complicated fistula in two or more stages, to pass silk threads through sinuses unopened at the first operation to facilitate finding them when the second stage is carried out.

OPERATIVE PROCEDURE

An anesthetic which will produce good relaxation of the perineal and perianal muscles is essential. Ether is satisfactory but nitrous oxide is not. A low spinal anesthesia is excellent, and it is rarely necessary to use over 50 milligrams of novocaine. We have at times used only 25 milligrams and sometimes 100 if the fistula is quite extensive. The occasional headache after spinal puncture is the only complication thus far encountered. It is annoying when it does occur, but if a small, sharp needle is used, little or no fluid lost, and the patient kept flat in bed afterward for several hours, headache can usually be avoided. Local novocaine anesthesia is unsatisfactory because of the distortion of the operative field. Caudal and sacral injections have been abandoned in favor of lumbar spinal because of the greater simplicity of administration of the latter.

The technique of operating upon a fistula is simple enough if certain fundamental conditions are obtained. The patient is placed in lithotomy position, with the table elevated as much as possible. A first class focussing light beam, passing horizontally over the operator's left shoulder, gives excellent illumination of the interior of the anal canal and lower rectum through a proper retractor. For this purpose I have found none better than the retractor devised by T. Chittenden Hill. It is somewhat like a Sims vaginal speculum but adapted to rectal work. Several sizes of probes and probe-pointed grooved directors are absolutely necessary. A fine probe may locate a sinus which a large one cannot enter. Plenty of time and patience completes the list of fundamental requirements. A knowledge of the probable site of an internal opening, when external ones are in a given locality, facilitates the search. Inasmuch as the internal opening is the key to the situation in any fistula, it *must* be located if possible, and this can best be done by careful investigation with a hooked probe before any probing or cutting is done externally. At no time can it be more easily found than at the outset of the operation, before any blood is produced to obscure the field. If the opening cannot be easily found or probed, it is usually possible to discern an abnormal crypt which was the probable site of the opening. Under these circumstances, if a probe passed into the main external opening can be palpated beneath the mucous membrane close to this crypt, one is justified in assuming that the opening was at this spot, though temporarily sealed over or so contracted that a probe will not enter. When this is the case, and all efforts to find an opening elsewhere have been unsuccessful, I force the probe through at that point, incise the tract, then excise mucous membrane for a distance all around the point of puncture. The actual incision of the tracts must be tempered by a due regard for preservation of sphincter control, and with a view to minimizing deformity in the end result.

Overhanging edges of skin should be removed and the mucous membrane edges trimmed well back in all cases to prevent their dipping into the incision during the healing process. The last point, and an important one, is to pack the incisions with *dry gauze* of such size that it projects into the rectum past the internal opening a short distance, lies entirely *in* the incisions, yet does not allow the skin edges to meet each other. An outer dressing with plenty of boric ointment is applied at the close of the operation, and renewed several times a day thereafter. The oint-

ment prevents chafing of the dressing on the exposed skin edges, but does not impregnate the packing enough to dislodge it prematurely.

AFTER-CARE

The packing comes away with the first bowel movement, on the third or fourth day, or is removed directly afterward. The incisions are then kept open by the passage of a well-lubricated gloved finger along the base every day or two. Occasionally in the very deep incisions gauze packs are reinserted for several days longer, but these are made small in order that too great separation of the wound edges shall not occur. Patients are seen several times a week thereafter until the fistula is healed. At each visit careful inspection of the external incisions and of the extension into the anal canal is carried out, and any bridging across is broken up. The presence of considerable pus in the wound, when the patient reports for dressing, is suggestive of the presence of an inadequately drained sinus, usually within the anal canal. If the operation has been well planned and executed, the incisions, however extensive, quite rapidly assume a healthy red appearance and display only the glairy mucoid exudate which is found on any granulating wound. Daily hot sitz baths or tub baths contribute greatly to the patient's comfort and to cleanliness of the incisions. The bowels are regulated so as to move daily or every two days by use of one of the mineral oil preparations.

COMPLICATIONS

Fistula surgery, carefully carried out, is quite free of complications.

Severe sepsis—It is very unusual for sepsis of any severity to develop after operation, but in an occasional case it may occur. The fact that no cases in this ten-year series developed a virulent postoperative infection bears out the statement. I have, however, seen one woman who acquired erysipelas in the wound on the fourteenth day after operation. The infection spread rapidly over both buttocks and proved fatal. Several instances of Bacillus Welchii infection have occurred following incision of acute ischiorectal abscesses but I am not aware of it happening after incision of a chronic fistula.

Incontinence of feces—This is also a rare complication. After extensive operations, with a deep incision outward from the internal opening, the resulting scarring may produce a concave defect at that point in the circumference of the anal outlet, and thus prevent complete closure of the opening even though the sphincter is normally active. Under these circumstances gas under pressure may escape, mineral oil may leak more easily than otherwise, and there may be difficulty in retaining a loose stool. Proper regulation of the food intake so as to keep the stools normal in consistency will eliminate this annoyance. It is often necessary to cut the external sphincter, rarely the internal, to cure a fistula. A clean cut through the muscle does no harm since it leaves the entire muscle otherwise intact, and the cut ends come together again with the contraction of the incision in healing. The only cases of true incontinence, that I have happened to see, have been cases in which the sphincters had been too diligently stretched by a surgeon either in operating for hemorrhoids or in an attempt to cure a fissure. This procedure may well tear the nerves to the sphincter, as well as its fibres, and produce a completely flaccid and useless muscle.

ANALYSIS OF TREATMENT IN THE SERIES

The cases I am reporting (388 cases), extending as they do over a ten-year period, were operated upon by many different surgeons, both of the visiting staff and of the interne staff. During the last two years of the series, by virtue of a special assignment, I have personally seen, with a few exceptions, all of the fistulae on both surgical services, either operating on them myself or turning them over to one of the interne staff. Beginning with 1929, also, most of the cases have been followed carefully in the recently organized Rectal Clinic of the Outpatient Department, whereas prior to that time they were handled in the general Surgical Clinic. These changes simplified and facilitated the after-care. A certain number of patients now, as always, are returned to their family physicians for subsequent care, often living at a considerable distance from Boston. Nevertheless it is a fact that a large number of the cases have healed, throughout the ten-year period, and have apparently healed following a variety of operative procedures, some of which could hardly be expected to produce a cure. By far the majority of the cases were comparatively simple fistulae, many of which, properly operated, might well have healed with little or no after-care. On the other hand, the series embraces a good number of extensive and complicated fistulae, and it is in these cases especially that frequent, careful, and long-continued after-care is necessary.

Operative procedures employed — A consideration of the different operations used in the series (Table 7) reveals the majority to have been a complete incision and drainage of the fistula in 254 cases. In a certain number of these, previous attempts to cure the fistula by inadequate methods had been made, apart from simple incision of the acute abscesses which may occur at the onset and during the course of any fistula. In 64 cases apparently the internal opening could not be located, and consequently the incision was not carried into the anal canal. These are the cases in which, by careful inspection and gentle probing with a fine probe, either the open-

ing could have been located or at least the crypt which formerly harbored it could have been determined, and the operation completed as previously advocated in such cases. Although some of these cases apparently remained healed, the chances were against it. It were better that these should have been added to the 16 cases in which the probe was pushed through at the probable site of internal opening and the incision completed, with removal of adjacent mucous membrane as additional surety that the original opening be destroyed.

The remaining types of operation in Table 7 all represent attempts to save time in healing or attempts to avoid deformity—both worthy objects for which to strive, but unfortunately resulting too often in failure and the necessity for a subsequent operation of the simple incision and drainage type. If an internal opening is dealt with by attempts to suture it by a purse string, or by pulling and suturing intact mucous membrane from above down over it (the Elting operation), or by suturing the entire wound after first excising the tract completely, —if these methods are used a cure is less likely to result. It does not seem rational to attempt to secure primary union in the anal canal.

TABLE 7

TYPES OF OPERATION EMPLOYED

(388 Cases)

1. Complete incision and drainage (internal opening located)	254
2. Complete incision and drainage (probe pushed through mucous membrane at probable site of internal opening)	16
3. First stage operations—not completed	5
4. Incision of tracts with suture internal opening	22
5. Excision of tract with suture of incision	5
6. Elting operation	3
7. Incomplete incision and drainage of tracts (internal opening not found)	64
8. Ligation of tract	1
9. Biopsy, with laparotomy for adenocarcinoma	1
10. Type operation not known	1
11. No operation	16
Total	388

END RESULTS

(280 Cases)

An end result was secured in 280 of the 388 cases in the series. Of the 280 cases, 37 were found to have died in the interim. This number is perhaps no greater than the normal incidence of death among 280 individuals of a wide age distribution and over an 11 year period. Yet the relatively large number of these who died of tuberculosis is of some significance. (See Table 8.) The remaining 243 cases are alive. Many have been seen recently, the others reporting by letter or telephone.

Cases now dead—Further analysis of these 37 cases (Table 9) reveals the fact that the fistula was definitely healed in eleven and probably healed in six others. It was definitely known to have been unhealed in 13 cases, and two others were probably unhealed. Some explanation of failure to heal is present in all of the 15, as six were not operated, one had carcinoma of the lower rectum, and eight had advanced tuberculosis. In five cases no information concerning the status of the fistula at time of death could be secured.

In comparing the results obtained in the different types of operations, these cases now dead are included with the living ones, since their death was not related to the operation.

TABLE 8

CAUSES OF DEATH

(37 cases—8 days to 10 years after discharge from hospital)

Tuberculosis	15
Cardiac disease	4
Pneumonia	4
Cirrhosis of liver	2
Nephritis	1
Diabetes	1
Carcinoma of kidney	1
Carcinoma of bladder	1
Carcinoma of cervix	1
Carcinoma of rectum	1
Unknown	6
Total	37

TABLE 9

FISTULA RESULT IN CASES NOW DEAD

(37 cases)

Status of fistula at time of death		*No. cases*	
Healed	11	17	
Probably healed	6		
Unhealed	13	15	Of these, 6 were unoperated, 1 had carcinoma of rectum and 8 had tuberculosis.
Probably unhealed	2		
Not known		5	
Total		37	

Analysis of the 280 cases traced—In this group of patients, 212 are healed, 52 are not healed, and 16 are uncertain. Table 10 reveals the results as obtained in the various operative procedures. In considering these results, attention is called to the classification of the operations as those which are practical and those which are impractical. Cures and failures occur in both groups, but the ratios are quite different. Seven procedures were employed. (See Table 10.) The first two may be considered practical operations, the other five impractical except under very favorable circumstances, and even then, not to be recommended.

Practical operations—In this group, consisting of those operated by methods 1 and 2 (see Table 10), there are 205 cases, of which 180 are cured, 14 have recurred, and 11 are indefinite. The first stage operations (method 3) were included below rather than here because they were never completed.

Impractical operations—The remaining five operative procedures are included under this heading, and embrace 66 cases, of which 31 are cured, 30 have recurred, and five are indefinite.

Discussion—In the above groups, eliminating the indefinite cases, is found a rate of cure of 92 per cent for the practical and 50 per cent for the impractical operations. Granting that the first group shows a rather satisfactory percentage of cure, though one which can be made even higher by careful attention to detail in operation and after-care, it is the second group which demands explanation. Why is the rate of cure even as high as 50 per cent in this group? It is difficult to explain. *Suture of the internal opening* was unsuccessful in three of the nine cases in which it was employed, a 33 1/3 per cent failure. The *Elting operation* was successful in both cases, each probably carefully chosen as suitable for it. Except in a few selected cases, however, it is an uncertain procedure. *Excision of the tract with primary suture* failed in 66 2/3 per cent of the six cases in which it was done. The five *partial operations* were of course undertaken with the idea of completing the operation at a later date, the patients apparently failing to return,—hence 100 per cent failure. *Incomplete incision and drainage* (internal opening not found and anal canal not incised) resulted in 53 per cent cures, and 47 per cent failures, in 39 cases. I suspect that in some of these cases the internal opening was found and the fistula completely incised, though the operative report in the record did not so indicate. This probability, together with the fact that internal openings do close spontaneously, sometimes for long periods, even when not favored by external drainage of the sinus, helps to explain the figure of 53 per cent, which seems much too high.

It should be remembered, also, in considering the end results in all of these groups, that a cure depends not alone on the operation but also upon the after-care.

TABLE 10

RESULTS IN DIFFERENT TYPES OF OPERATIONS

(280 Cases)

1. Complete incision and drainage (internal opening located)	193	cured	171		
		recurred	12		
		indefinite	10		
2. Complete incision and drainage (probe forced through m.m. at probable site of int. opening)	12	cured	9		
		recurred	2		
		indefinite	1		
3. First stage operation (not completed)	5	cured	0		
		recurred	5		
4. Incision of tract with suture int. opening	9	cured	6		
		recurred	3		
5. Excision of tract with suture of incision	6	cured	2		
		recurred	4		
6. Elting operation	2	cured	2		
		recurred	0		
7. Incomplete incision and drainage of tract (internal opening not found)	44	cured	21		
		recurred	18		
		indefinite	5		
No operation	8	recurred	8	Cured	212
				Recurred	52
Spontaneous healing	1	cured	1	Indefinite	16
Total	280		280		280

SUMMARY

1. The foregoing pages present a statistical study of 388 cases of anal fistula admitted to the Massachusetts General Hospital in the years 1921 to 1930 inclusive, together with certain observations and opinions of the author based on his own experience.

2. The males in the series are three times as numerous as the females.

It should be remembered, also, in considering the end results in all of these groups, that a cure depends not alone on the operation but also upon the after-care.

3. In two-thirds of the cases there was a delay of over six months from onset of symptoms to the final operation. In many cases the delay was much longer—up to eighteen years.

4. Only 2.4 per cent of the fistulous tracts examined pathologically were tuberculous although 34 patients had had tuberculosis elsewhere in the body and 15 subsequently died of this disease.

5. Multiple internal openings occur sufficiently often to necessitate a search for them in each case.

6. Recent end results have been obtained in 280 cases and show the percentage of cure to be 92 per cent in those operated by a complete incision and drainage method. An analysis of the results from other operative procedures is also given.

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THE CHOLESTEROL TO CHOLESTEROL ESTER RATIO IN THE PLASMA OF DIABETICS WITH ADVANCED ARTERIOSCLEROSIS*

BY C. B. F. GIBBS, M.D.,† ELIZABETH BUCKNER,† AND W. R. BLOOR†

SINCE the advent of insulin in 1922 there has been a marked change in the relative causes of death in diabetes. Whereas, formerly 15 per cent of the patients died from arteriosclerosis and 60 per cent from coma, now 47 per cent die from arteriosclerosis and only 20 per cent from coma. In other words insulin has rescued the diabetic from death by coma only to have him die from arteriosclerosis[1].

Because of the increased importance of the disastrous effects of arteriosclerosis, any study of the factors of its causation and development becomes of value.

Concerning non-diabetic arteriosclerosis Aschoff[2] believes that an increase in the cholesterol content of the plasma is the initial step in its production. He states that with increased amounts of cholesterol more and more deposition takes place, mainly in the form of cholesterol esters. These esters are then broken down, the cholesterol crystallizing out and the fatty acid combining with calcium to form soaps, which later are changed over into inorganic salts. These pathological changes are reversible in the early stages inasmuch as Aschoff found marked decrease in the occurrence of atheromatosis during the latter part of the World War when food supply became lessened.

The deposition of cholesterol ester in arteriosclerotic arterial walls has been investigated by Schönheimer[3] who finds that in sclerotic arteries there is a deposition of cholesterol much as it is in the blood, e.g., 50-60 per cent esterified and 25-26 per cent free, and that this ratio remains constant. Since he finds that the ester content of calcified arteries is as high as in the uncalcified, he is not in agreement with Aschoff that esters change to calcium salts. Warren[4] suggests the additional factor of fluctuations in sugar concentration which occur more rapidly in blood than in tissues and so cause disturbances in osmotic pressure relationships. These changes may tend to increase the permeability of the intimal lining making it easy for lipoid-laden plasma to penetrate the vessel wall.

It has been further suggested by Rabinowitch[5] that in diabetes with lipemia, there is constantly exerted in the capillaries a colloidal pressure greater than normal. To overcome the latter for purposes of renal excretion, a greater hydrostatic pressure is required; this increased pressure, though relatively small, when continued over a long period of time probably has the same effect as more marked intracapillary pressure exerted over a short space of time. He questions, therefore, whether this may not be a cause for the marked incidence of cardiovascular disease in diabetes.

Bloor and Knudson[6] found in plasma of unselected diabetics that there was no increase in the percentages of cholesterol esters even though the total cholesterol was in some cases 4-5 times normal.

The relation of plasma cholesterol esters to the diet has been investigated by Knudson[7] who found that feeding cholesterol or its esters with a fat free diet resulted in increased total but no increase in esterified cholesterol. On the other hand feeding fat without cholesterol resulted in no increase of total but an increase in esterified cholesterol[8], that is, cholesterol takes part in fatty acid absorption by the formation of esters.

From a clinical standpoint it is of interest to note the general trend of dietetic treatment of diabetes at the present time. Particularly within the past two years has there been a

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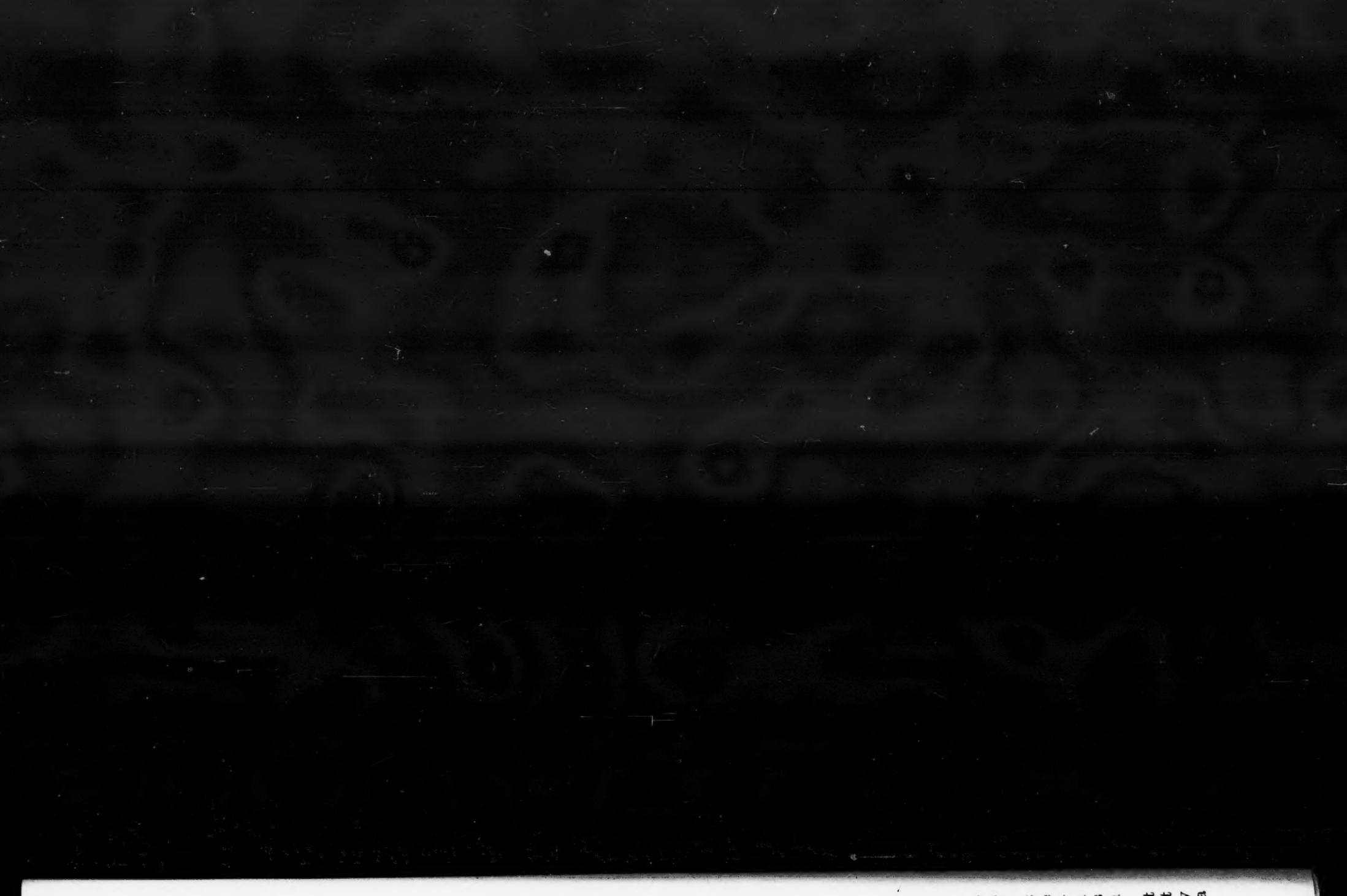

Case	No. Samples	Digitonin Method		
		Total mg. %	Ester mg. %	Ester % of Total
Group A				
C. W.	1	202	136	70
M. S.	3	334∓9	230∓6	69∓2
Wm. B.	3	172∓13	123∓7	72∓9
R. E.	4	215∓15	145∓15	69∓1
C. B.	5	249∓24	177∓21	70∓2
C. T.	8	205∓18	140∓20	68∓4
A. R.	4	267∓10	122∓8	68∓1
A. Z.	2	172	110	64
D. R.	4	218∓16	155∓12	71∓1
	Total			
Av.	34	226∓32	155∓25	69∓2
Group B				
C. McN.	1	121	83	69
F. M.	4	225∓33	155∓29	68∓4
B. R.	2	170∓6	124∓3	73∓0
E. W.	5	195∓9	131∓10	67∓2
L. Go.	1	222	162∓	73
L. Gr.	2	265∓19	191∓15	72∓1
	Total			
Av.	15	199∓46	148∓4	70∓2

TABLE II

Cholesterol—Cholesterol Ratios In Plasma

% otal	Colorimetric Method: Total mg. %	Ester mg. %	Ester % of Total	Blood Sugar	Diet: Calories	% Fat	Units Ins.	Onset Age	Duration Diabetes years	Obesity	
	285	215	76	101	1400	56	0	75	1	+11%	Early gangrene left foot
∓2	438∓15	310∓12	71∓4	289∓32	2000	55	0	55	1	?	Mid-thigh amputation
∓9	223∓5	164∓8	71∓4	236∓59	1480	53	0	70	2	?	Gritti-Stokes amputation
∓1	298∓6	214∓12	72∓5	158∓38	1565	72	0	56	18	?	Mid-thigh amputation
∓2	321∓18	241∓10	75∓2	134∓14	1710	68	10	56	3	+ 2%	Amputation toe
∓4	259∓13	181∓10	68∓3	140∓34	2000	56	15	55	7	− 2%	Amputation toe
∓1	321∓30	234∓9	71∓4	162∓23	1600	56	30	42	10	?	Mid-thigh amputation
	221	148	67		1800	56	25	58	2	−21%	Gangrene toe
∓1	273∓12	202∓15	73∓2	230∓21	1400	56	55	50	5	?	Mid-thigh amputation
∓2	293∓61	212∓45	72∓3	181∓37		58		55			
	176	128	73	222	1200	65	0	70	6	−10%	General arteriosclerosis
∓4	303∓41	227∓28	75∓3	108∓10	1600	47	5	52	6	+ 2%	General arteriosclerosis
∓0	182∓2	130∓2	72∓0	173∓17	1500	72	15	64	1½	+12%	General arteriosclerosis
∓2	245∓8	186∓9	76∓2	200∓44	1860	53	20	66	4		General arteriosclerosis
	247	193∓	78∓	97	1710	68	30	38	17	− 9%	General arteriosclerosis
∓1	344∓3	253∓6	74∓1	173∓45	1520	71	40	49	19	+ 2%	Circulatory changes in foot
∓2	250∓60	186∓46	75∓2	162∓42		62		56.5			

decided advance in the amount of carbohydrate in the diet at the expense of fat. The result of this shift on the total cholesterol, at least, is rather striking.

In 1931 Rabinowitch[9] reported the summary of 164 cases in whom the shift was made from an average intake of 89 Gm. carbohydrate per day to 246 grams with a decrease in total calories in these diets from 1906 to 1774. With this change the average cholesterol fell from 257 to 187 mg. per cent. This result was obtained without increase in insulin requirement.

In the present study, patients with the most advanced arteriosclerosis were chosen for the study in order to determine the absolute and relative percentage of the cholesterol esters because of their apparent importance in the development of arteriosclerosis. The diet was kept at low maintenance levels with the fat calories averaging 60 per cent of the total.

TABLE I

NORMAL CONTROLS

	Colorimetric Method		
	Total mgm. %	Total mgm. %	Ester % of total
S. E.	256	179	68
E. L.	196	130	66
C. G.	196	137	69
K.	183	117	63
L.	220	122	55
Y.	170	103	60
H. P.	257	161	62
R. W.	260	165	63
P.	307	198	64
V. E.	256	158	61
G.	274	165	60
P. G.	244	135	55
AV.	235	147	62

The methods used were the colorimetric procedure of Bloor and Knudson and for comparison the digitonin precipitation method worked out by Okey[10].

It may be said that while the colorimetric values obtained are about 30 per cent higher, the ratio of free to bound cholesterol is practically the same by the two methods.

As subjects fifteen patients from the Diabetic Clinic of this medical school were selected.

Group A consisted of nine patients having such severe arteriosclerotic changes in the lower extremities that gangrene had resulted in amputation of toe, foot or leg. The duration of the diabetes varied from one to 18 years, the ages from 41 to 75 years. Five were of sufficient diabetic severity to require insulin.

Group B was composed of six patients with advanced arteriosclerosis in the lower extremities showing evidence of impending circulatory insufficiency but not actual gangrene. In these, diabetes had existed from 1.5 to 19 years and the ages ranged from 38 to 70 years. All but one required insulin for diabetic control.

For controls 12 normal individuals with an average age of about 32 years were studied.

In all instances samples of blood were obtained from an overnight fast or after a fat-free breakfast.

DISCUSSION

It is evident from the tables that the average total cholesterol is higher in both groups as determined by the colorimetric method than is found in the normal controls, Group A averaging 293 mg. per cent, Group B 250 mg. per cent and the normals 235 mg. per cent.

The percentage of cholesterol combined as esters is also higher, Group A showing 216 mg. or 72 per cent of the total cholesterol, Group B 186 mg. or 75 per cent and the normal controls 147 mg. or 62 per cent.

As compared with the group of 26 normals previously studied by Bloor and Knudson, the contrast is still more striking. In these 58 per cent of the total cholesterol was found to be in the form of ester.

From the evidence it is clear that the cholesterol ester to cholesterol ratio averages about 10 per cent higher in these arteriosclerotic diabetics than in the normal individuals.

The colorimetric method as used in this work gives values for cholesterol and cholesterol esters about 30 per cent higher than does the digitonin method. However, a comparison of the percentage of ester content shows a fair correspondence, e.g., 72 per cent against 69 per cent in Group A and 75 per cent against 70 per cent in Group B.

A further comparison of these data with those obtained from a group of non-diabetic

TABLE III

AVERAGE OF RESULTS

	No. Cases	No. det.	Digitonin			Colorimetric			Blood Sugar	% Fat. Cal. in Diet	Av. Age
			Total	Ester	% Ester	Unsapon. Total	Ester	% Ester			
Group A	9	34	229	158	69	293	216	72	181	58	60
Group B	6	15	199	148	70	250	186	75	163	62	65
Normals	12	12	—	—	—	235	147	62		34	32
Normals B & K (6)	26	26	—	—	—	200	116	58		34	

elderly individuals showing advanced arteriosclerotic changes is in progress.

SUMMARY

The total and esterified cholesterol values in the two series of diabetics with arteriosclerosis were found to be abnormally high and highest in the group with the most advanced sclerosis (Group A). The esterified cholesterol in relation to total cholesterol in both groups with arteriosclerotic changes was found to be 10-15 per cent above that of normal averages.

These results suggest a possible relationship between the high ratio of cholesterol-ester to total cholesterol in blood plasma and the development of atheromatous changes in diabetic patients. However, the possible relationship of this high ratio in these patients to the high fat diet is not excluded, nor are other factors such as age and weight, and arteriosclerosis of other than diabetic origin.

These will be studied as time and material permit.

CONCLUSIONS

The cholesterol-ester content of the plasma of diabetic patients with advanced arteriosclerosis was found to be higher than normal both in absolute amount and in percentage of cholesterol combined as ester.

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THE MULTIPLE CAUSES OF SEIZURES IN THE INDIVIDUAL EPILEPTIC PATIENT*

BY WILLIAM G. LENNOX, M.D.†

PHYSICIANS, confronted with a patient subject to seizures, are disposed to look on a demonstrated abnormality or an antecedent circumstance as either the whole cause of the seizures, or as entirely unimportant. They are satisfied if but one apparent explanation is at hand. An indiscretion in diet, the onset of puberty, a psychic impassé, an epileptic relative, a brain trauma or tumor; one such culprit is chosen to shoulder the whole blame. This may be termed the "all or none" conception of etiology.

Most writers on the subject now regard seizures as a symptom. In any large assembly of persons subject to seizures a diverse number of structural and physiological abnormalities will be found. The clinical conditions which may be associated with convulsions have recently been listed by Cobb[1]. It is not the purpose of this article to enlarge on this subject, but rather to point out that *in a single individual* the etiological factors are usually multiple, and hence it is the duty of the physician to hunt not for the cause but for the causes of seizures.

In most ill persons the multiplicity of the etiological factors is well recognized. Classifying adjectives are used to distinguish them; as underlying, principal, or fundamental, and precipitating, immediate or contributing causes. Even in the case of infections where the presence of a specific organism is fundamental, it is yet agreed that an exposed person will not succumb to illness unless additional contributing causes are present, such as certain seasonal or climatic conditions, a certain age zone, a weakening of "resistance" through exposure or concomitant disease, or a natural "susceptibility".

The sound of human voices may start an Alpine avalanche on its destructive way. Yet none would speak of noise as wholly explaining avalanches. In dealing with seizures, the physician often fixes the whole blame on some event which preceded the first attack. Constipation, a plate of beans, a fever, or an outburst of emotion, is named as "the cause". Subsequent seizures, however, will be preceded by other apparent causes. This results in frequent changes of diagnosis, of treatment, and (incidentally) of doctors. In time the patient will be treated by various specialists, each of whom, like a blind man feeling different portions of an elephant, reports a single and widely different abnormality and holds out hopes of improvement or cure if this is corrected. Years of valuable time may be consumed before the patient finally is given a thorough survey in the endeavor to ascertain

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not some single cause but the various different causes concerned.

Illustration of the compression of the etiologies of each case into a single alcove is found in reports of the Craig Colony for epileptics. In these reports it seems that seizures in each patient must be due either to exogenous or endogenous toxins, to brain injury, or to idiopathy. Never are they due to two or more of these causes. Even an experienced clinician like Peterman[2] places the entire blame of seizures in his child patients on one of various causes. "Epilepsy" as a cause of seizures is non-existent when his patients are less than six months old but form 72 per cent of the cases in children over ten. In my opinion, this is but another way of saying that the older the child, the smaller the part played by apparent contributing causes.

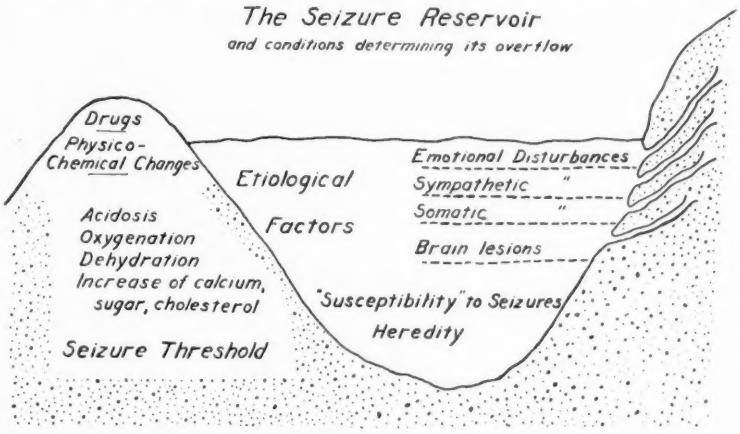
The following case history will illustrate what is meant.

The patient, seen in consultation with Dr. James Arneill of Denver, is a sixteen year old girl having a mild grand mal seizure every few weeks. Her paternal uncle died with convulsions as an infant in the course of an attack of chicken pox. Otherwise the family record was clear. The patient's birth was normal, but at four years she contracted scarlet fever with resulting infection of the right middle ear and mastoid. In the midst of this infection the child had three convulsions, following which her left arm and leg were paralyzed for 36 hours. The middle ear was opened and drained but the ear has continued to discharge periodically ever since. For a period of six years thereafter she was without epileptic symptoms. At the age of ten she fell from a horse and sustained a minor head injury. Shortly after she began to have episodes when she had queer thoughts and would speak incoherently. In these attacks she did not entirely lose consciousness or mus cular control; if playing the piano she would continu to drum the keys. These petit mal attacks came in showers of five or six at about monthly intervals and persisted for two years. When ten years old her breasts began to enlarge and when eleven she began to menstruate. Her subsequent physical development was rapid. At 14 years the patient had her first grand mal seizure. During the two years which have elapsed, she has had about fifteen convulsions, the majority of them occurring without apparent precipitating cause.

Careful physical examinations had revealed obesity, very large breasts, and a basal metabolic rate of minus 24 per cent. There was evidence of sympathetic instability; she had wide pupils, moist palms, ready flushing, cyanotic color of the hands and feet, and mottled skin, and on stroking the skin an intense white line appeared. She stood high in her school work. Her mental age was 15 months ahead of her real age and her intelligence quotient was 109. She appeared preoccupied and absorbed in her own problems and was inclined to daydream. She was over-conscious of her appearance and although a good-looking girl, she expressed a feeling of inferiority regarding her appearance and her weight. The psychiatrist, who saw her in consultation, believed she had the personality and traits of the pre-schizophrenic child, probably on the basis of over-protection and over-concern on the part of her parents.

This patient therefore presented evidence of five conditions which are of etiological importance in seizures, viz., heredity, brain injury, endocrine dysfunction, vasomotor disturbances, and psychic disorders. The bewildered parents had received widely divergent opinions from various different kinds of specialists, and consecutive trials of various kinds of treatment had been made. Obviously a simultaneous attack on all abnormalities was needed.

The different forces making for seizures in any patient may be compared to subterranean springs which feed a mountain lake or reservoir, as illustrated in the accompanying diagram. The reservoir fills and periodically overflows (the overflowing being a seizure).



The various influences which make for seizures in an individual are represented as waters impounded in a reservoir. Five groups of causes are recognized, viz., seizure susceptibility or heredity, brain lesions, abnormalities of the body outside the brain, disturbances of the sympathetic nervous system, and emotional difficulties. Through feeding springs, the volume of water may be continuously increased, so that there is a periodic overflowing of the restraining banks in the form of a seizure. In order to keep the waters below the overflow level the incoming springs must be discovered and blocked and the banks, representing the seizure threshold, raised. Careful study of the individual patient will usually discover two or more causes of seizures. The relative importance of each cause will vary in different patients and in the same patient from time to time.

The deepest portion of this reservoir is occupied by the patient's "susceptibility", or his tendency to have seizures if other appropriate stimuli are also present. In the diagram sus-

ceptibility is represented as without a feeding spring, since presumably this tendency is inborn and constant. Possibly it may be what is ordinarily termed "heredity". This is the "essential" or "idiopathic" portion of epilepsy and is probably present to some extent in every person having seizures. Only one-fifth of patients with epilepsy know of a relative similarly affected, because only a small fraction of those carrying the abnormal genes ever actually develop seizures. Sufficiently potent contributing causes were not present. Seizures are not inherited, but only the tendency to have seizures under appropriate circumstances. In this respect, epilepsy does not differ from many other medical conditions such as cancer or tuberculosis.

A potent stimulant to convulsions is an abnormality of the central nervous system, such as a congenital defect, a scar from cerebral infections, vascular accidents, or trauma, a neoplasm, etc. Although such a condition when present is important, it is far from sufficient in itself to cause seizures. Only about one in 20 soldiers with brain injury or one in five patients with brain tumor have seizures as a symptom. I have tabulated the histories, personal and family, of 1500 non-institutional epileptic patients. The total number of near relatives (parents, siblings and children) and the number of these who had a history of seizures was ascertained. The epileptic patients were then divided into two groups; those who did and those who did not have a history of brain injury antedating the onset of seizures. I found that patients with brain injury had only 60 per cent as many relatives with seizures as patients who did not have a traumatic stimulus. The greater the hereditary factor, the less is the need of contributing factors.

A third group of causes comprises abnormalities outside the brain, such as defective structure or function of the gastro-intestinal tract, of endocrine glands, of the circulation or abnormal concentrations of the chemical constituents of body fluids. A fourth group embraces disturbances of the sympathetic nervous system. A fifth and closely related group comprises emotional and psychological disturbances. Patients with such disturbance are especially liable to conflicting medical advice and mistreatment, because of the present schism between those interested in physical and psychic mechanisms. Illustrative cases follow:

An intelligent and unusually attractive young woman of nineteen had been in an automobile accident two years previously which had frightened but in no way physically injured her. The morning after the accident she was awakened by rigidity and jerking of her left arm. This jerking has been present nearly every morning and night since, at the time of falling asleep or of awaking. On seven occasions following the jerking, an unpleasant sensation has passed down her arm to the fingers, and then up the arm to the head, at which point she has lost consciousness and had a generalized convulsion.

Because of the close time relationship of the onset and the accident, and because of the patient's habit of getting her way by means of emotional outbreaks, she had been receiving treatment on the basis of a traumatic neurosis. However, the seizures faithfully reproduced the description given by Hughlings Jackson of localized convulsions, followed on occasion by generalized convulsions, due to a lesion of the motor cortex of the brain. I believe that in this case an undemonstrated cortical lesion determined the pattern of the seizures, but the onset was due to emotional trauma.

Another patient, when a married woman of 38 (four years ago), had for the first time attempted coitus with a man not her husband. In the midst of the attempt, which was the termination of a long period of sexual excitement, she lost consciousness. When she regained consciousness, she had a left hemiplegia, which has persisted. Since then she has also had occasional grand mal seizures.

The patient had been treated on the basis of a hysteria, but her present spastic hemiplegia with signs of Babinski and Hoffmann prove that she had had a cerebral vascular accident, presumably precipitated by circulatory strain accompanying emotion.

In each patient it is ordinarily possible to find evidence of several of the five groups of causes which have been enumerated. Not only the number, but the relative importance of these causes will vary in each patient. Some of the causes will be principal, some precipitating. In the diagram, the more fundamental causes are placed at the bottom.

Precipitating causes are those which exhibit great fluctuations in intensity. Consequently, they easily lead to an overflowing of the threshold, i. e., to a seizure. These causes are linked with the cerebral circulation, the discharge of endocrine glands, or emotional disturbances.

Contributing causes are more or less constant abnormalities, such as scars, tumors, or gross malformations of the brain, or structural abnormalities elsewhere in the body. Obviously, a seizure cannot originate in a connective tissue or tumor cell, but only in a functioning nerve cell.

The fundamental cause of seizures must be some disturbance in the physiology or chemistry of the cerebral ganglion cells which, under an appropriate stimulus, renders the cell temporarily abnormal. This abnormality may be closely linked with what we glibly call "heredity."

In the matter of practical treatment an attempt must be made to stop all channels which are pouring convulsive stimuli into the seizure reservoir. In addition to lowering the waters, one may attempt to raise the banks. The seizure threshold may be raised by the use of anti-convulsant drugs or by altering the body physiology with the induction of acidosis (through muscle work, breathing carbon dioxide, inges-

tion of acids or acid-forming salts, and the induction of ketosis by fasting or the use of ketogenic diet). This threshold may sometimes be raised by dehydration, the full oxygenation of tissues, and the increase in blood sugar, calcium and, perhaps, cholesterol.

Comprehensive treatment requires broad knowledge on the part of the physician. The patient is too often the victim of specialism. The surgeon may think only of a traumatic brain lesion and ignore the crying need of allaying the patient's fear reactions or his emotional conflicts. The psychiatrist may be so much interested in the patient's dreams and fantasies that he does not notice an atrocious posture. The family doctor may see a family tree pendant with convulsions and never consider a brain tumor. By and large the physician with the broadest perspective and humanity is the one best fitted to treat such a many-faceted symptom as epilepsy.

This effort to see the problem whole is important from the standpoint of treatment as well as of diagnosis. Eradication of one abnormality may not reduce the seizures below the threshold level, whereas correction of two or three may do so. A recognition of the multiplicity of causes offers hope in some cases considered hopeless. In the face of a large hereditary factor, or of a cerebral injury, some physicians assume that no remedial measures are available. Even in such cases, however, correction of relatively minor physical or emotional abnormalities may sufficiently lower the seizure level so that seizures but rarely "spill over". Even if few epileptic patients are "cured", almost all can be helped.

CONCLUSIONS

An "all or none" conception of etiology is no more true for epilepsy than for other medical conditions. The physician must seek not simply a cause, but the various causes of seizures. Five groups of causes, some or all of which are usually present in each epileptic, are enumerated. The relationship of these to the seizure threshold is explained by the analogy of a reservoir. Treatment of the individual should consist of a simultaneous effort to correct abnormalities and to raise the patient's seizure threshold.

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TREATMENT OF AMNESIA*

Case Report

BY BENJAMIN COHEN, M.D.†

A VARIETY of methods have been employed in the past in the treatment of functional memory disorders following prolonged drug, alcoholic, uremic, or eclamptic intoxication with central nervous system involvement.

Hypnotism has probably enjoyed the greatest popularity. The effect of this psychological measure in clearing memory gaps has been described by White[1], Pilgrim[2], Forel[3], Janet[4], Stern[5], and several others. The therapeutic mechanism is said to be dissociation of the memory[4], and surge of subconscious recollections breaking through the strata of upper unconsciousness becoming manifest with the oncoming of the hypnoidal state[2].

Classic hypnosis seems to have been the preference of most of the authors mentioned, occasionally varied by methods of free association, designed to inhibit censorship of recollection. Results appear to have been satisfactory, although in many cases repeated and protracted hypnotic seances were necessary before headway could be made.

Hypnotic-hypnosis[5], employing medinal or paraldehyde, has been reported successfully employed in the Neuro-Psychiatric Clinic of the University of Vienna as an occasional substitute for routine hypnosis in the treatment of amnesia.

Buckley[6] has reported facilitating the recovery of partially identified cases by a gradual process of reëducation and reproduction of impressions recalled by friends and acquaintances of the patient.

Pilgrim[2], in addition to hypnosis, frequently had the patient give the alphabet, halting at the letter which started his name. This recollection was occasionally sufficient to evoke a train of associations.

Today, in the therapeusis of amnesia, there is available an organized procedure which is much more adaptable to general use than pure hypnosis or hypnotic-hypnosis. That method is psychoanalysis. While this psychological approach will probably always remain in the province of the specialist for the dissolution of conflicts and complexes, it deserves much wider trial than it has hitherto received in the identification of amnesia victims.

The accompanying report outlines the basic routine successfully followed in the treatment of a case of retrograde amnesia admitted to this hospital.

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CASE REPORT

A young woman, about twenty-five years of age, was admitted to the Grafton State Hospital on November 8, 1932, for observation under the commitment name of "Jane Doe."

Medical certificate of the same date states in part: "She said: 'I don't know where I live; I have an idea I have been here about a year; all mixed up; can see places and people but can't name them. . . . I have been taking veronal'. . . She could tell nothing about herself."

Previous to admission to the Grafton State Hospital, the patient had spent nine days in another hospital, where she had been brought in a condition of stupor. She was confused and unable to give any information concerning herself. Physical examination there revealed variable areas of anesthesia, and absent gag reflex. Routine laboratory tests were negative.

For two days following admission the patient lay quietly in bed, eyelids inflamed, sleeping much of the time. In response to enquiry, she stated that she had taken twenty-five veronal tablets. She seemed fairly well oriented as to time, place, and person. Her knowledge of contemporary political events and geography was at least as good as the average. She mentioned that she had a child six years of age.

Transcript of record states: "Nothing is known of the patient except her story. This is very vague and unreliable. She presents a loss of memory. . . . She denies knowing her name, and has given several in an effort to find her right one. . ."

Occasional recollection, insufficient to establish identity, cropped out in waking dreams. The patient's anesthesia seemed strongly suggestive of a hysterical reaction and a diagnosis was made, preceding transfer, of "Psychoneurosis-Hysteria."

On admission to this hospital, the patient was unable to reveal her identity. She recalled having employed various aliases but did not know her correct name. She easily recollected events subsequent to the onset of her illness. She believed that she had a child, and was from T——, New Hampshire.

Subsequent events have shown that the patient was not from the latter state, and that the town mentioned did not exist.

On the same day, following completion of admission routine, an attempt was made to prepare the groundwork necessary for psychoanalytic study. To secure the confidence of the patient, she was told that she would be treated in kindly fashion; that every effort would be made to provide for her comfort; and that the examiner was especially interested in dispelling her amnesia.

She was informed that the method to be utilized might appear novel, but that with her aid there was likelihood of success. She promised coöperation. She was told to note and record any dreams which might occur during the night. The ward nurse was instructed to supply writing material on request.

On the succeeding day, November 9, 1932, three common psychoanalytic measures were initiated:

(1) Dream Analysis[7].
(2) Free Association[7].
(3) Word Association[8].

The results were as follows:

Dream Analysis:

The patient stated that she was unable to sleep the preceding night, and spent most of the night watching occurrences in her dormitory. From time to time she thought of a man, whose eyes were steely cold, and who smiled chiefly when he wished to be disagreeable. He seemed to pursue her with a knife, at times asking her if she wished to be choked.

The patient could not identify this individual, or continue further in this direction.

Free Association:

The patient was asked to recline in bed, the examiner sitting at her bedside, out of visual range, ruling lines upon sheets of paper to be employed in the succeeding test. She was asked to look abstractedly into the distance paying no attention to the examiner and revealing every thought that entered her mind without effort at censorship. All that could be gleaned was the following: She cannot help thinking of her experiences of the last few days. In a sense it is a huge joke; that she should have areas in her body devoid of sensation; that she should be exhibited as a curiosity to medical students; that she should be so carefully watched as a potential suicide on her trip here.

But from another angle, the situation becomes devoid of humor. She realizes that she wishes to return to old surroundings, and does not know where to go. (No old memories, it will be noted, were brought forward. Still, it is possible that further effort might have produced results by the method just described.)

Word Association:

The patient continued to recline in bed. The basic one hundred word stimulus group of Brill[8] was employed, with relevant additions and substitutions suggested by the history. Time interval was noted by stop watch, the record gap being measured from the moment of completion of stimulation word or phrase to the beginning of response. Some of the answers seemed worthy of development. Consequently, questions were introduced between routine words of stimuli, and response noted before the patient could censor or inhibit association. Results are recorded as follows:

Stimulus	*Response*	*Time in seconds*
family	home	4.2
where	there	3.6
home	mother	2.2
mother	father	1.8
husband	wife	1.2
marriage	divorce	2.1
sad	glad	1.6
friend	foe	1.8
to kiss	to bite	3.0
to sin	to forgive	3.2
unjust	unfair	2.0
bread	water	2.2
to prick	to stab	1.6
pity	envy	2.0
to ask	to tell	2.0
to quarrel	fight	1.2
intercourse	men	2.2
woman	man	1.2
T——	New Hampshire	1.2
who lives there	mother	4.8
address	rural delivery	2.0
care of	*B——	2.2
fraud	cheat	1.8
insurance	policy	3.2
company	P——	7.2
academy	T——	1.8
graduate	no	1.4
left when	'24 or '25	6.2
stork	baby	1.2
drunk	gin	2.0

*Patient's correct patronym.

Stimulus	*Response*	*Time in Seconds*
†baby	A——	2.2
†baby	baby girl	41.2
veronal	dope	2.4
contented	discontented	1.8
shame	pride	2.8
ridicule	snare	2.0
to sleep	to stay awake	8.8
nice	bad	1.6
smile	frown	2.4
to beat	to whip	2.8
wild	tame	1.4
anxiety	worry	2.0
why	I don't know	15.8
R——	hotel	2.4
pride	shame	1.8
†to wait on table	waitress	1.8
†where	S——, Mass.	7.4
†name of place	H—— Hotel	3.2
what street	on no street; on a park or square	4.2
to swim	drown	1.4
voyage	boat	27.4
name of boat	no name	10.2
destination	nowhere	6.0
ship	water	6.2
box	spar	1.8
unfair	J——	13.8
knife	fork	1.4
abuse	maltreat	2.4
insurance	due	3.0
husband	wife	1.8
pity	envy	2.0
yellow	coward	3.2
lead	follow	3.0
friend	enemy	2.0
luck	bad luck	2.2
despair	hate	1.8
to pay	owe	2.2
pure	dirty	1.8
angry	man	1.4
money	cash	3.8
finger	toe	1.8
expensive	cheap	1.8
bird	wings	2.2
to fall	drop	1.6
book	paper	1.8
stern	stalk	2.6
to dance	to walk	2.2
town	city	1.2
sick	well	1.2
needle	thread	1.7
poor	rich	1.2
lamp	dark	3.8
rich	poor	1.6
tree	grass	1.8
mountain	hill	1.2
salt	pepper	1.2
new	old	1.2
custom	habit	2.2
head	feet	1.2
green	red	1.8
water	ice	2.0
to sing	cry	2.0
long	short	1.2
window	pane	1.8
to cook	clean	4.2
cold	hot	1.2
flower	cabbage	2.0
to wash	to clean	3.4
cow	horse	3.2
deportment	behavior	1.6
narrow	wide	1.6
brother	sister	1.2
to take care	mind	1.4
lead pencil	paper	1.8
plum	apple	2.1
house	barn	1.6
glass	window	6.0
fur	cloth	2.0
big	small	1.2
carrot	turnip	2.8
to paint	varnish	9.2
part	whole	2.2
old	new	2.2
bride	groom	1.2
door	window	1.6
to choose	select	1.8
hay	straw	2.0
mother	father	1.8
funds	money	7.8

†Correct.

The patient's average reaction time in the word association test compares favorably with the 2.4 seconds mentioned by Brill[8]. According to the latter, prolonged interval before response, repetition of words of stimuli, and failure of reproduction are the features indicating complex. Brill defines the word "complex" as a group of ideas of marked emotional accentuation which were split off from the consciousness and repressed into the unconscious.

It will be noted in the case described that some of the most significant recollections are preceded by time delay.

It soon became evident, as the association test progressed, that routine questions based on the newly discovered facts could supplant key words, and that record of time intervals could be abandoned.

The patient discussed at length on the same day the details of a recent boat trip, a history of alcoholism, and former places of residence and employment including that at S——, which proved correct. The identity of "J——" was correlated with the description previously given by the patient on enquiry regarding dreams.

Later social service studies proved some error to exist in answers, chiefly in assigning incorrect dates for the occurrence of events in her past life, and alleging that "J——" had lived at a certain address, which originally was that of her brother.

On later days, pending completion of social service investigation, the patient was able to clarify details which had remained obscure. There proved to be, however, a few amnesic gaps which the patient herself could never complete; such information had to be conveyed to her.

Reunion of the patient and her family was effected on November 16, 1932, and on December 7, at the expiration of legal stay, the patient was discharged from the hospital.

CONCLUSION

(1) A method of treating functional amnesia has been presented, illustrated by a case report.

(2) It is considerably simpler than the methods of hypnosis and hypnotic-hypnosis, and infinitely more desirable than dependence upon spontaneous recovery.

(3) It merits trial in appropriate cases before involved therapeutic measures or prolonged discussion methods are adopted.

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THE PROGRESS OF NUTRITION

BY FRANCIS LOWELL BURNETT, M.D.*

I. The Wisdom of the Body, the Conscious Colon, and Indigestion

"WHO hath put wisdom in the inward parts? or who hath given understanding to the heart?" (The Bible, Job 38:36). "It is true that the ultimate goal and the biological justification of science is the improvement of human conditions. . . . This great secret of success in science was fully realized by Harvey, when he enjoined us to search out by experiment not the causes and cure of disease, but the secrets of Nature. We ourselves are but part of the order of Nature, and all knowledge therefore is contributory to the science of medicine. . . . The determination of the output of blood from the heart and the cause of its variations evidently seemed to Harvey a problem whose solution was ready to hand. He says: . . . 'This much I know, . . . that the blood is transfused at one time in larger, at another in smaller quantity; and that the circuit of the blood is accomplished, now more rapidly, now more slowly, according to the temperament, age, etc., of the individual, to external and internal circumstances, to naturals and non-naturals—sleep, rest, food, exercise, affections of the mind, and the like' " (Starling, The Wisdom of the Body, *Brit. M. J.* 2:685, 1923).

As we ourselves are part of the order of Nature, and the circuit of blood is influenced by sleep, rest, food, exercise, affections of the mind, and the like, it is obvious that the cycle of digestion and absorption of food may also be peculiarly influenced by our ways of eating and living. From this point of view, the digestive functions operate as part of a perfect nutritive apparatus, but vary according to the time and ways of eating, as well as the amount, preparation, completeness, proportion of the aliment, and other factors. As the stomach reasons and rejects, by the abnormal act of vomiting, food and drink from overindulgence, may not other functions of the nutritive apparatus act with a similar conscious capacity through the wisdom of the body, to prevent the absorption of injurious substances? Such a function is likely to operate in the proximal colon; because in most mammals under normal conditions a secondary digestive pouch is formed of this portion of the gut. Here the aliment is worked over by waves of peristalsis and antiperistalsis until absorption is complete; and then "a segment from its contents is every now and then nipped off by a ring of constriction and carried away to be moulded in its further passage down the colon to the firm fecal nodule" (Elliott and Barclay-Smith, *J. Physiol.*, 31:272, 1904). In man, the contents of the colon are carried away by two forms of intestinal action. One is the movement of Fischl and Porges (*München. med. Wchnschr.* 58²:2063, 1911) by which small, uniform segments are slowly passed onward through the distal colon. This act is similar to the normal action in mammals, signifies the operation of the proximal colon, and is evidently normal for man. The other is the mass movement of Holzknecht (*München. med. Wchnschr.*, 562:2401, 1909) by which large, irregular masses are rapidly passed from the cecum to the rectum. This rapid propulsive act resembles vomiting, and evidently indicates that the proximal colon also operates with conscious capacity. And thus acting with understanding, this digestive pouch causes aliment composed of too much coarse, uncomminuted, incomplete, and disproportioned food to be rejected and passed on and out in soft irregular masses, but causes aliment composed of proper food to complete its cycle of digestion and absorption and pass on and out in firm, uniform segments. In this way, the conscious colon may be made to serve as an exact and delicately adjusted control of our ways of eating and living; and through an understanding of the influence of this conscious control on the final moulding of the colonic contents and intestinal rate, a definite and unrecognized type of intestinal indigestion can be determined (Burnett, *Boston M. & S. J.*, 184:371 & 415, 1921). As ordinarily considered, indigestion is a vague and variable condition of the human body; but when it is determined by normal indices of absorption it becomes a readily recognized and definite disorder. Furthermore, from this point of view, indigestion is indicative of an early and slight disturbance of a complex nutritive apparatus, of malnutrition, and of a previously unrecognized cause of disease.

II. Anabolic Nutrition and Health

"Disease is so generally associated with positive agents, the parasite, the toxin, the *materies*

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morbi—that the thought of the pathologist turns naturally to such positive associations and seems to believe with difficulty in causation prefixed by a *minus* sign. Even when Eijkman had clearly established that beri-beri arose during the consumption of decorticated and not whole rice, he was led to suggest not the simple view that the cortical substance was of direct use to the body but rather that it was necessary to neutralize the otherwise deleterious effect of a diet overrich in starch. Save for the mental bias just referred to, it is very difficult to see why so roundabout an explanation should have been thought necessary. Its effect in every case has certainly been to delay the recognition of the deficiency diseases . . . ." (Report on the Present State of Knowledge Concerning Accessory Food Factors [Vitamines]. Med. Res. Committee, No. 38, H. M. Stationery Office, London, 1919).

The failure to recognize the cause of disease prefixed by a minus sign may be due to the inability to understand the results of malnutrition from the passage of digested products through instead of into the body. In such a deficiency disorder there is evidently a miscarriage of nutrient substances, through which normally nourished and healthy cells cannot be developed or maintained; for "nutrition is the sum of the processes by which an animal . . . absorbs, takes in, and utilizes food substances. Assimilation is the essential and final part of the process" (Webster's New International Dictionary, G. & C. Merriam Co., Springfield, Mass., 1924). On the other hand, the correction of erroneous ways of eating and living to operate the proximal colon produces the regular dejection of firm feces and a slow intestinal rate; thus indicating the better utilization of food substances and better assimilation of nutrient substances for the development or regeneration of healthier cells. On this account such a process has been called anabolic nutrition (Burnett, *New Eng. J. Med.*, 205: 251, 1931), whereby in the treatment of disease a morbid process causing a deficiency disorder is evidently replaced by a vital process creating an improved state of well-being or an exact condition of health. And the theory has received experimental proof in practice, especially by the regeneration and maintenance of a healthy skin in the treatment of psoriasis (Burnett, *Am. J. Med. Sc.*, 166: 415, 1923 and *New Eng. J. Med.*, 199: 321, 1928). Some confirmation, too, has been obtained from the practice of anabolic nutrition in the treatment of arthritis (Burnett and Ober, to be published).

To create anabolic nutrition for the relief and cure of psoriasis or arthritis, patients are educated to operate the proximal colon from records of their nutrition during a week. On the paper is recorded the food consumed, the time spent at meals, the time and kind of dejection, and the determination of the intestinal rate. From an examination of these records every few weeks, health measures are advised until patients learn to produce entirely segmented feces and an intestinal rate of about 63 and 134 hours. And when absorption of this kind is generally maintained, signs of these diseases very slowly disappear. In this treatment, however, as an exact state of health is evidently created to relieve disease it is obvious that this condition must be subsequently controlled to prevent recurrences and cure these diseases. To control health, former patients are required to observe every dejection and, if it is not segmented, correct some erroneous way of eating or living. Likewise, they are required to determine the intestinal rate and weight every few weeks; and they are urged to have an exact and comprehensive health examination once a year.

Varying according to the size, age, sex, and activity of the person, the health of anabolic nutrition is generally maintained from the daily consumption of food containing 50-100 Gm. of protein, 50-100 Gm. of fat, and 150-200 Gm. of carbohydrate, the vitamins, and the essential salts. The food is thoroughly comminuted and is generally composed of buttered toast or muffins, or cereal, and coffee, tea, cocoa, or milk in a light breakfast; an egg or cheese dish, soup or stew, a vegetable dish or salad, fresh or cooked fruit, and a cookie or cake in a light lunch; and meat or fish, two or three vegetables, bread and butter, a dessert, and fruit if necessary in a substantial dinner. Laxatives are entirely omitted. An attempt to defecate is advised an hour or so after breakfast and again at bedtime, and two segmented stools are not uncommon a day. After several soft dejections, a day is passed without a dejection for the benefit of the body.

III. Food and Well-Being

In the past, through innate reasoning, adversity, opulence, altered social or business conditions, or other causes, people have changed their customs of eating and their selection of food. Some changes have been beneficial apparently and others detrimental to well-being and health. In this country, Mendel (*J. A. M. A.*, 99: 117, 1932) has noted and described some of these variations. Within the century the consumption of animal protein has become somewhat less; for at present few eat meat at every meal, and some of this food has been replaced by the more readily prepared cereal foods. Then again, more recently, the people have become "vitamin conscious", and vegetables, fruits, milk and butter have been more generally selected. The consumption of one food, sugar, has increased tenfold. In 1823, an average of 8.8 pounds was ingested, whereas in 1931 each person consumed an average of 108 pounds during the year. A comparison by Banning (*Ztschr. f. Hyg. u. Infectionskrankh*, 113: 345, 1932) of food consumption in a Dutch town now and twenty-five years ago showed the protein percentage to be the

same; but the fat had doubled, and the carbohydrate was reduced one fourth. Somewhat similar statistics have been reported by Cathcart and Murray (*Med. Res. Counc., Spec. Rep. Ser.*, No. 165, 1932. [H.M.S.O., London]) of the selection of food by families in Cardiff and Reading (Wales). The average of an individual was 3,000 calories a day, of which ten per cent was protein, thirty-two per cent fat, and fifty-eight per cent carbohydrate.

The adaptation of less civilized people to the best selection of food to promote better health may not be possible on account of economic reasons. At all events, the problems of nutrition in India have been described by McCarrison (*Nutrition Abs. & Revs.* 2:1, 1932) in an interesting and edifying article. Throughout this country the staple foods of the masses are rice, maize, millet, wheat or barley. The grains are not refined and are generally consumed whole. In spite of this fact, analyses of these foods have shown them to be deficient in suitable protein, certain vitamines, iron, calcium, phosphorus, and sodium. A rice diet, which has the lowest nutritive value, was tested experimentally in pigeons and monkeys, and produced a poor appetite, loss of weight, diarrhea, cardiovascular depression, anemia, disorders of the skin, edema, nervous irritability, intercurrent infections, etc. To these observations a parallel was found in the poor stamina, muscular development, lack of endurance, and proneness to infection of rice eating races. Specifically, these people are subject to respiratory diseases, gastro-intestinal disorders, especially diarrhea, malnutritional edema, and beri-beri. A wheat diet produced in animals about the same degree of morbidity; but of the wheat-eating races kidney stones occurred in many individuals. Other kinds of cereal food evidently produced peptic ulcers and goitre, which are problems of the moment in India.

Changes in the food consumption of the German people on account of the economic crisis have been reported by Tyszka (*Klin. Wchnschr.*, 11²:1169 & 1209, 1932). He found that the amount of meat eaten per man was reduced from 126 to 82 Gm., fats from 55 to 42 Gm., bread from 307 to 239 Gm., potatoes from 421 to 276 Gm., and vegetables and fruit from 194 to 106 Gm. And the average number of calories per man had been reduced from 2887 to 2227. A basis for the rationing of prisoners in the United States has been reported by Howe and MacCormick (*Am. J. Pub. Health*, 22:375, 1932). The cost of the ration varied between 25 and 35 cents per man per day, and gave an allowance of 0.75 lb. of meat, 1.00 lb. of dairy products, 0.80 lb. of bread and flour, 0.15 lb. of fat, 1.00 of root and 0.60 lb. of leafy vegetables, and 0.23 lb. of fruit. The ration yields 3955 calories, of which the constituents average 140 Gm. of protein, 116 Gm. of fat, 545 Gm. of carbohydrate, 0.93 Gm. of calcium, 1.62 Gm. of phosphorus, and 0.028 Gm. of iron, per man per day.

A report on the diets in poor law children's homes has been drafted by the Advisory Committee on Nutrition in England (H. M. Stationery Office, London, 1932), and the following recommendations made. A pint of milk a day should be given each child under 16 years of age. Green vegetables are particularly valuable, and two apples or oranges should be supplied weekly. Greater use should be made of cheese to replace more expensive meat; but liver, roes, carrots, tomatoes, and water cress, when reasonable in price should be consumed. A variety of foods should be supplied, and these changed from time to time in order to avoid a regular schedule. Another pamphlet, published by the Advisory Committee on the Criticism and Improvement of Diets (Ibid.), states that a man's food should yield 3000 calories and contain 37 grams of animal protein. Women and children require less. The food should contain calcium, phosphorus, iron, and iodine, and the vitamins A, B, C, and D also; and these are best supplied by the consumption of milk, eggs, fat fish and roes, liver, fresh vegetables, and fruit. The relation between the consumption of carbohydrate (especially sugar) and the incidence of disease has been pointed out by Paton (Edinburgh M. J. 39:556, 1932). Perhaps the excessive consumption of this food increased the susceptibility to colds, the frequency of acidosis in children, the prevalence of rickets and dental caries, and also the high incidence of diabetes and cancer. An increase in the consumption of animal protein by Swedish people has been observed by Holmgren (*Ztschr. f. Ernähr.*, 2:65, 1932) during the last thirty years. Such an increase has caused a reduction of the ingestion of vegetables, and thereby the incidence of disease in this race may have increased.

Norgaard and Rud (*Ugesk. f. Laeger*, 94: 447, 1932) studied the influence of physical exertion on meat eaters and vegetarians. Each group was composed of twelve persons and they were required to walk 50 kilometers without rest. Examinations at the end of the test showed the meat eaters to have a higher pulse rate, a less reduced systolic pressure, but a higher temperature than the vegetarians. And in most of the participants an albuminuria with blood and casts occurred. The average loss of weight of the meat eaters was 1.75 kg., while the vegetarians lost 2.98 kg.

IV. Ophthalmia, Keratomalacia, and Infections

A few years ago, McKenzie (The Future of Medicine, Henry Froude, London, Eng. 1919, p. 1) wrote that little or nothing was known about disease in the incipient stages, but when it had advanced so far as to damage the tissues and present pronounced signs, it was generally recognized. Such a statement is as true

of a definite deficiency disease as of one supposed to be of another origin. Indeed, Mouriquand (*Ztschr. f. Vitamin.* forsch. 1:38, 1932) has recognized this fact and has stated that a slight vitamin deficiency from variations in the food ingested, changes of environment, etc., produced an alimentary dystrophy. Such an alteration in the development of tissue was not often recognized but generally preceded the appearance of definite signs of deficiency diseases. Mendel (*J. A. M. A.* 98:1981, 1932) has compiled an interesting and valuable account of the history, chemistry, lesions, and occurrence of vitamin A. The clinical features of the disease due to the loss of this vitamin have been described by Eusterman and Wilbur (*J. A. M. A.* 98:2054, 1932). In the review, the history of night blindness, xerophthalmia, and keratomalacia, the physiology and pathology of A avitaminosis, and the relationship of the food factor to infections are summarized. This relationship is generally discussed, but more evidence is necessary before the effect of the absence of the vitamin on colds, tuberculosis, or other infections can be definitely established. An appeal has been issued by Kirnan (*Ind. Med. Gaz.* 66:452, 1931) for an Indian section in the International Association for the Prevention of Blindness. This is because the origin of this malady differs in the various countries. In India, the chief cause is keratomalacia in early childhood, and this is generally relieved from the ingestion of complete food and from improved nutrition.

Patients afflicted with xerophthalmia or keratomalacia were not uncommonly found among prisoners in Uganda, Africa, according to the report of Owen and Hennessey (*Trans. Roy. Soc. Trop. Med. and Hyg.* 25:367, 1932). One of these who had severe lesions of the eyes from keratomalacia consumed a complete food, but the disease progressed and he died. On examination, he was found to have a very extensive biliary cirrhosis; and it was suggested that the damaged liver prevented the utilization of vitamin A. Pillat (*Arch. f. Ophthalmol.* 128:201, 1932) has observed and reported that an increase of pigment in the cornea occurred in Chinamen with xerophthalmia, and that the excess of color perhaps acted as an aid and protective device to shade the sunlight from the weakened basal cells of the eyes. A study of the gastric secretion of patients with vitamin A deficiency has been reported by Pillat and Chang (*Chinese M. J.* 46:254, 1932). Of the twenty-five patients examined twenty-one had keratomalacia and four pre-xerosis; but in only ten of the total a low gastric acidity was found, and this was generally proportionate to the severity of the diseases. The vitamin A content of 325 human livers was determined calorimetrically by Moore (*Lancet*, 2:669, 1932). The livers of diabetics generally had a large amount; but those of patients that succumbed to heart disease, respiratory and kidney diseases, or septicemia, had a small amount of vitamin A. And in those of other infectious diseases the content of the food factor was very variable.

The relation between malnutrition and infection in children has been studied and reported by Hess (*Acta Paediat.* 13:206, 1932). The administration of ultraviolet irradiation; irradiated ergosterol, or cod liver oil was found not to increase the immunity of infants to respiratory infections. Evidently these disorders were not due to a lack of vitamin A and thus were not relieved by a diet rich in this factor. Perhaps a deficiency of vitamin C induced a susceptibility to infection of the respiratory tract, but this produced merely a local disturbance. The value of vitamin A in the treatment of pneumonia has been observed and described by Orenstein (*South Africa M. J.*, 6:685, 1932). And from a comparison of the mortality rates, the time required for hospital care, and the sequelae, there was no difference in the course of the disease in the 381 patients who received 12 to 24 minims of a concentrate daily and a similar group who were without a large amount of this food factor.

V. Beri-Beri, Pellagra, Nerve Disorders, and Reproduction

In a comprehensive article on vitamin B deficiency, Cowgill (*J. A. M. A.* 98:2282, 1932) has described the pathology, diagnosis, and course of beri-beri; and has also pointed out that a partial lack of this vitamin produced loss of appetite and a restriction of growth. Beriberi in Japan according to Maki (Kitasato, *Arch. Exper. Med.* 9:202, 1932) has been reported as a disease that generally afflicts infants and adolescents of the cities. The disease ranked sixth among the causes of infant mortality, and of the total deaths fifty per cent were nursing infants. More males were subject to the disease than females, and the morbidity was highest in the fall months. A deficiency disease that resembled beri-beri has been noted by Buchanan (*Trans. Roy. Soc. Trop. Med. & Hyg.* 25:383, 1932) in British Somaliland. The disease was called "Chachaleh" by the natives. It produced painful muscles and bones, paresthesia, and edema, and a peculiar symptom known as "burning feet". There was no involvement of the nerves and the edema was of the legs and not the heart. The natives of the towns as well as those of the jungle were affected; but the disease was most common after the dry season, when the consumption of meat, milk, and fresh vegetables was greatly reduced. Improvement occurred from the injections of iodine, the ingestion of yeast and also of onions. Experimental proof of the absence of lesions in beriberi has been reported by Woollard (*Austral. J. Exper. Biol. & M. Sc.* 9:173, 1932) from the histological examination of the nervous system

of pigs. The deficient conditions were produced from food without vitamin B, and also one without vitamins B and G. Symptoms of a nerve disorder and a marked retardation of growth were produced in the animals, but these were considered to be complicating effects and not essential factors of the nutritional disorder. Somewhat different results have been observed by Zimmerman and Burack (*Arch. Path.* 13: 207, 1932) from a study of lesions produced in the nervous system of dogs from food without vitamin B complex. In these animals extensive demyelination was noted in many of the large nerves and brachial plexus, and the lesions in the peripheral nerves were proportionate to the severity of the paralytic symptoms. A peripheral polyneuritis was produced likewise in a few dogs which were starved except for an adequate amount of vitamin B and water. Changes in the ganglion cells and the destruction of myelin in the brain or cord were not considered responsible for the symptoms.

In a special article by Underhill (*J. A. M. A.* 99: 120, 1932) the relation between vitamin G deficiency and pellagra has been discussed. This vitamin appears to be more valuable in the prevention than in the cure of the disease. A careful study and a discussion of 102 cases of pellagra have been made by Boggs and Padget (*Bull. Johns Hopkins Hosp.*, 50: 21, 1932). Of this number 31 were due to dietary deficiency, 40 to chronic alcoholism, and 31 arose as a complication of a debilitating malady. Abstinence from food, common in drunkards on a spree, was considered as one of the etiological agents. Psychoses, indeterminable diarrhoea, cancer of the digestive system and tuberculosis were some of the diseases of which pellagra was a complication. Pellagra was found most prevalent in the late spring. Forty-five of the patients had nerve lesions and ninety had achlorhydria. Treatment with a diet of liver or the extract was found especially effective. The food supply and incidence of pellagra in seventy-three families in rural South Carolina have been studied by Stiebeling and Munsell (*U. S. Dept. Agri. tech. bull.*, No. 333, Oct. 1932), with the following conclusions. In the late spring the food consumed by these families consisted largely of cereal food, sweets, and fats. Such a diet contained inadequate protein, A, C, and G vitamins, and also inadequate iron and calcium. In more than half of the families subject to the disease, dry and evaporated milk, lean pork, wheat germ, tomatoes and yeast were supplied during the winter. As a result, only a few families had the disease and then not severely. The best means to prevent pellagra is by proper production, conservation, and consumption of the food on the farm. A somewhat similar study has been made also of some families in Florida by Sandels and Grady (*Arch. Int. Med.* 50: 362, 1932). In this work the families free of pellagra ate more eggs, cheese, succulent vegetables, and fruit. An outline and argument for the control of pellagra has been written by Wheeler and Sebrell (*J. A. M. A.* 99, 95, 1932). Many simple inexpensive foods added to the diets of rural southerners have been found to prevent the disease. And in institutions where the food was controlled the incidence of pellagra has been reduced to a minimum, indeed, in the largest asylum in the south the mortality for all inmates has been reduced from 6.2 per cent to 0.1 per cent by the use of proper food. Such a reduction occurred when the mortality of the disease for the state at large had increased one hundred per cent. Much could be done to reduce the incidence of the disease through agricultural agencies, home economic bureaus, etc., as the chief aim should be to assist the families to solve the problem by their own industry and resources. On a farm which showed a good home garden, a cow, or some poultry, the occupants seldom needed to be investigated for the disease; but those living on one surrounded by last year's cotton crop bore watching.

Guthrie (*J. Trop. Med. & Hyg.* 35: 71, 1932) has made gastric analyses of 161 patients with pellagra and found that thirteen per cent had an excess, eighteen per cent a reduction, and sixty-nine per cent no acid; and the injection of histamine did not change the results in subsequent examinations. And Tscherkes (*Arch. f. Schiffs. u. Tropen-Hyg.* 36: 81, 1932) has examined the blood of sixteen patients with severe pellagra and found the non-protein nitrogen, sugar, calcium, and potassium to be normal. On the other hand, Ballif and Ornstein (*Compt. rend. Soc. de biol.* 109: 234, 1932) have found the cholesterol content of the blood in acute pellagra reduced from 0.02 to 0.06 per cent.

The value of the ketogenetic diet in the treatment of epilepsy has been reviewed by Pulford (*Ann. Int. Med.* 6: 795, 1932) with the following conclusions. Epilepsy is a symptomatic, not an idiopathic, disorder, and until the precipitating cause is discovered cannot be cured. Convulsions may be generally arrested by the control of ketosis, water, and sodium chloride-calcium balance. The dangers of the ketogenetic diet are a deficiency of nitrogen, calcium, and the vitamins, but this should be prevented by the use of yeast, viosterol, and calcium.

A comprehensive account of the disorders produced by a deficiency of vitamin E has been published by Evans (*J. A. M. A.* 99: 469, 1932). A general review of nutrition in relation to reproduction has been compiled by Leitch (*Nutrition Abs. & Revs.* 2: 451 [Jan.] 1933). This showed that malnutrition from disproportions in the vitamins, proteins, or minerals of a diet had a detrimental effect on reproduction, and indirectly, through a lowered vital resistance from malnutrition, infections occurred, especially with Br. Abortus, which terminated pregnancy.

VI. Scurvy and Skin Diseases

A means to determine a prescorbutic condition from the strength of the cutaneous capillaries has been elaborated by Göthlin (*Klin. Wchnschr.*, 11²: 1469, 1932). The test was carried out by putting a compression band of 50 mm. of mercury around the upper arm for fifteen minutes. If more than six petechiae were apparent it was positive. The test has been applied to twenty-four healthy male and female students in the autumn and spring by Gedda (*Skandin. Arch. f. Physiol.*, 63: 306, 1932) to find out the seasonal variations of the anti-scorbutic vitamin in these young persons. The total number of petechiae observed in September was 54, or an average of 2.2 for each individual. The number observed with the same group the following May was 104, or an average of 4.3 for each person. On this account the conclusion was reached that the food consumed during the winter caused a slight vitamin C deficiency. The prescorbutic anemia of infants has been studied and treated by Rohmer and Bindschedler (*Acta Paediat.*, 13: 399, 1932). In most of the infants iron alone proved ineffective, but in a few lemon juice was beneficial. All of the patients, however, responded favorably when the fruit-juice and the metal salt were given together. On this account, vitamin C may take part in the metabolism of iron. Even more definite evidence of the effect of vitamin C on blood regeneration has been offered by Mettier and Chew (*J. Exper. Med.*, 55: 971, June, 1932) from an experimental study of blood regeneration in scorbutic guinea pigs. During the severest period of the disease the hemoglobin was reduced to about fifty per cent, the corpuscle count to about 3,000,000, some reticulocytes were apparent, and most of the fat tissue in the marrow was replaced by cells of the erythropoietic series. After the administration of orange juice, however, the reticulocytes in the circulation increased from about five to twenty per cent in a few days, and almost complete regeneration of the hemoglobin and corpuscles was produced in several weeks. The examination of the bone marrow in a few animals showed many mitotic figures and adult corpuscles.

An article on recent advances in the knowledge of scurvy and the antiscorbutic vitamin has been compiled by Hess (*J. A. M. A.*, 98: 1429, 1932). Lesions of the bone in infantile scurvy have been studied from roentgenograms and reported by Kato (*Radiology*, 18: 1096, 1932). The conclusions reached were that some of the generally accepted signs were not pathognomonic. For instance, beading of the ribs and separation of the epiphyses were often found in these scorbutic infants; and the white line of Fraenkel was the least characteristic sign of the disease. The only typical sign was the shadow of a subperiosteal hemorrhage which was often determined clinically. A few fatal cases of infantile scurvy have been observed by Stokes and Campbell (*M. Clin. N. Amer.*, 16: 219, 1932) in which the fever appeared to be intensified by the ingestion of orange juice. Römcke and Rygh (*Deutsche med. Wchnschr.*, 58: 1362, 1932) kept a patient with scurvy on a diet without vitamin C and administered 0.1 Gm. of methylnornarcotine three times a day, and this synthetic accessory food factor brought about the relief of the disease. The chemistry of the antiscorbutic vitamin has been described by Vedder (*Mil. Surgeon*, 71: 505, 1932). It has been isolated in a pure crystalline form and thought to be an isomer of glucuronic acid.

Eczema in infants, according to Hess (*Deutsche med. Wchnschr.* 58: 52, 1932) has been generally relieved by the substitution of a milk made from almonds for cow's milk. On the other hand, Urbach (*Wien. med. Wchnschr.*, 82: 846, 1932) observed that eczema and scrofula in infants improved if obese or atrophied patients were treated by accepted dietetic régimes. Children with exudative lesions of the skin, however, should be given a much restricted fat and salt food and a further attempt should be made to determine food idiosynerasies. In a study of the dietetic treatment of eczema in childhood Schiff (*Deutsche med. Wchnschr.*, 58: 882, 1932) has found that almond milk, banana cream, vegetable and fruit juices were effective as the principal foods to relieve the disease in young children. As the condition of the skin became healthier, the almond milk was gradually replaced by cow's milk. In older children food composed largely of vegetables and fruits was found beneficial in the treatment of the disease.

VII. Rickets, Osteomalacia, and Dental Disorders

In a comparison of the disorders that resulted from contracted pelves of pregnant women, Fletcher (*Practitioner*, 129: 305, 1932) has found the morbidity and mortality higher in England than in Sweden, Denmark, or Holland. They were the result of consuming food that produced poor skeletal development. A study of the pathology of rickets in children has convinced Policard et al. (*Bull. Histol. appl. Physiol. et Pathol.*, 9: 226, 1932) that a disorderly arrangement of the trabeculae in the cartilaginous ends of the bones existed; for the trabeculae appeared like bone but were composed of an osteoid tissue which remained uncalcified. Schlutz (*J. A. M. A.*, 99: 384, 1932) has written a review of the clinical significance of vitamin D in infancy and childhood. In the article, the relation of the vitamin to rickets and to calcium and phosphorus metabolism, its dosage and excessive use, and its activation in foods by ultraviolet irradiation are some of the sub-

jects discussed. From the examination of roentgenograms of 218 infants and young children admitted to the outpatient department of a hospital in Sydney, Australia, Maddox (*Arch. Dis. Childhood,* 7:9, 1932) has found clinical evidence of rickets in fifty-two per cent. Of this number the disease was active in twelve per cent, healed in thirty-one per cent, and the diagnosis was not definite in the others. One-third of the children with active rickets and a half of the children with healed rickets were nursed. A study of the food consumed by forty-three per cent of the children showed a deficiency of vitamins A and D.

The value of salmon oils in the treatment of rickets in children has been determined by Eliot et al. (*J. A. M. A.,* 99:1075, 1932). Of the kinds tried the oil from the Chinook fish was the most potent, but those from the Pink and Sockeye species were twice as potent as cod liver oil composite. The Sockeye and Chinook were equal but the Pink oil inferior, in their vitamin A content, to cod liver oil. The value of the various preparations of irradiated ergosterol has been studied and reported by Schaferstein (*Acta Paediat.,* 12:186, 1931-1932). In the prophylactic use of these preparations in healthy children, doses of 0.5 to 2 mg. were given for 50 to 60 days; but in rachitic children larger doses of 0.8 to 3 mg. a day were required for the same period. Vigantol and radiostol were found more effective than präformin. In some patients with fractures of the bones union was accelerated, but in others with tuberculosis the condition was unchanged, from vitamin D therapy. Loeffler (*Deutsche med. Wchnschr.,* 58: 1013, 1932) has examined the cadavers of 49 rachitic children who had been given large doses of vitamin D over long periods of time; and did not find any macroscopic or microscopic evidence of abnormal calcification in the tissues. An opportunity was afforded Strauss (*Ztschr. f. Kinderh.,* 52:556, 1932) to study the effects of large doses of irradiated ergosterol on the bones, from an autopsy of a severely rachitic child, who died of anemia and splenic enlargement. In the examination, areas of calcification were very irregular in the trabeculae, but new zones were apparent in the epiphyses and uncalcified cartilage still remained near the spongy portions. Abnormal areas of calcification were not found in the vessels, kidneys, or other tissues.

The examination of an infant that lived only three days and was born of a woman with osteomalacia has been described by Turnbull (*J. Path. & Bact.,* 35:419, 1932). The examination showed atrophy of bone and deposition of osteoid tissue, which were definite evidence of disordered calcification and the occurrence of intromalacia or rickets in the fetus. The disease was attributed to the ingestion of incomplete food by the mother. The successful treatment of patients with osteomalacia from the use of 45-60 gr. of tricalcium phosphate a day, has been recorded by Wilson (*Lancet,* 1:1142, 1932). The patients were exposed to sunlight also. On the other hand, Wilson (*Indian M. Gaz.,* 67:320, 1932) has likewise observed that the daily administration of 4 dr. of sun irradiated yeast to some patients with osteomalacia who were not exposed to the sunlight was beneficial.

The teeth as part of the skeletal system often exhibit defects and deformities from many recognized diseases of the bones, according to the valuable study made and reported by Zajewloschin and Libin (*Frankfurter Ztschr. f. Pathol.,* 43:245, 1932). From microscopic examinations of the teeth of patients dying of osteoporosis, osteitis fibrosa, syphilitic periostitis, etc., a decalcification, especially in the dentine layer, was apparent. This was manifested by a thickening of the odontoblastic layer, the development of layers of poor and well calcified dentine, and the formation of interglobular spaces, fissures, and sometimes sequestra. From chemical analyses of such teeth, an abnormally low calcium and high magnesium content were found. The results indicated that dental caries was due to endogenous disorders, rather than to structural defects that originated in the development of teeth. Interesting observations have been made by Sampson (*Brit. M. J.,* 1:538, 1932) on the condition of the teeth of a semi-civilized people living on the remote island of Tristan da Cuhna. Caries was found in only 1.84 per cent, and in 83.3 per cent of 156 persons examined the condition of the mouth was quite normal. The teeth were a yellow color, strong, and well calcified. Some tartar covered the teeth, as tooth brushes were unknown. The food consumed by the people consisted generally of fish, eggs, milk, potatoes, and green vegetables. Cereals, sugar, tea, cocoa, and coffee were luxuries. Mellanby and Pattison (*Brit. M. J.,* 1:507, 1932) have reported the value of a cereal free diet and one rich in calcium and vitamin D in young children. The teeth before the consumption of this diet were hypoplastic and many were carious. At a subsequent examination after six months of the diet, the teeth had become harder, the old carious spots had not spread, and new cavities had not developed. Hanks (*J. Den. Res.* 12:518, 1932) has recorded the value of orange and lemon juice on the dental development of children between ten and seventeen years of age. Of the 422 children observed, a group of 99 served as controls and consumed only a good mixed diet. But in the others, who had consumed the citrous fruit for two years, as well as the good mixed diet, dental caries was found to be arrested in 49.8 per cent and retarded in 16.4 per cent.

VIII. Anemia, Nephritis, and Protein Metabolism

The value of certain foods and injected extracts to improve the nutrition of bone marrow and to prevent and cure various kinds of anemia has become more and more apparent. In an interesting article, Abt and Nagel (*J. A. M. A.*, 98: 2270, 1932) have reported a study of various measures for the relief of anemia in premature infants. The early additions of vitamins, liver extract, or desiccated hog's stomach to the food were found ineffectual; and liver and iron were found but slightly beneficial. The failure to respond to these measures was ascribed to the imperfect structure of the blood forming organs in these undeveloped infants. On the other hand, Ochsenius (*Deutsche med. Wchnschr.*, 58: 1015, 1932) has discussed the prevention and treatment of infantile anemia. The deficiency is ascribed to alimentary disorders, which arose especially from the ingestion of foods containing insufficient iron—such as milk, cereal food, and some fruits. On this account, only half a liter of milk a day was recommended and the loss made up by the consumption of meat. After three months, the addition of orange juice and iron containing vegetables to the food of these infants was found beneficial; but the ingestion of liver was necessary to relieve hyperchromic anemia. All forms of infantile anemia, but especially those of alimentary origin were observed by Strunz (*Arch. f. Kinderh.* 95: 98, 1932) to respond to the ingestion of liver. A large dose was necessary, and one corresponding to 50 to 60 Gm. of fresh liver per kilogram of body weight was given. The comparative value of good food and care alone and the same measures supplemented by the administration of 5 mg. of copper, 7 mg. of arsenic, or a combination of liver, iron and copper has been studied by Redmann (*München. med. Wochenschr.*, 79[1]: 868, 1932) in children who were slightly or severely anemic from malnutrition, infections, or rickets. In the slightly anemic, all of these measures with the exception of the use of arsenic, caused improvement, although the liver, iron, and copper treatments proved to be the most effective. On the other hand, in the severely anemic, arsenic was found to be three times as potent to increase the hemoglobin as the other measures, but copper alone produced the highest corpuscle count.

The cause and treatment of the anemia of pregnancy, especially in the tropics, have been discussed by Gupta (*Indian M. Gaz.* 67: 421, 1932). The disorder was considered due to defective hematopoieses from several factors, of which inadequate nutrition was found the chief cause. And the deficiency was not so much the result of poverty as of injudicious dieting. A well-balanced diet, composed of milk products, liver, honey, vegetables, and fruits was advised. The effect of liver extract and iron on three types of secondary anemia has been observed by Cheney and Niemand (*Am. J. M. Sc.* 184: 314, 1932). The first type occurred in patients with chronic infections, the second in those who had had hemorrhages, and the third in those who had anemia of unknown etiology. The treatment brought about a very rapid improvement in the anemia of hemorrhage, but in the others only a slight or occasional improvement occurred. A high protein milk powder has been administered to patients with sprue in the tropics by Fairley (*Trans. Roy. Soc. Trop. Med. and Hyg.* 25: 297, 1932) and proved valuable. The powder consisted of protein, fat, and carbohydrate in a ratio of 1 : 0.3 : 1.3. The patients' food was gradually increased also, from 697 to 2516 calories a day. And when megalocytes were found in the blood liver was given, and also hydrochloric acid, if low. The mineral content of oysters and their value in the treatment of anemia have been investigated by Coulson et al (*Am. J. Pub. Health*, 22: 1141, 1932). From fresh bivalves obtained along the Atlantic and Gulf Coasts of the United States the amount of iron found varied from 20.9 to 135.3, the copper from 4.6 to 137.2, and the manganese from 1.05 to 4.33 mg. per kilogram of weight. As a therapeutic test, groups of anemic rats were fed oysters from various localities, and the weeks taken to regenerate the normal hemoglobin determined. Oysters from the Carolinas had the highest content of iron and brought about the most rapid blood regeneration.

The consumption of liver or liver extracts in the treatment of pernicious anemia has been partially replaced recently by the use of intramuscular or intravenous injections of a specially prepared extract. In a critical article by Schlumm (*Klin. Wchnschr.* 11[1]: 975, 1932) the values of the ingestion and injection of liver preparations have been compared. Through the ingestion of the preparations most patients with the typical anemia responded to the initial treatments. A few failed to improve during secondary treatments. In some of these patients, extracts were injected, and two of them not only produced an initial improvement but also maintained it subsequently. Strauss and Castle (*J. A. M. A.* 98: 1620, 1932) also have observed the effects of injecting liver extract into patients with pernicious anemia, and found them to improve rapidly. The extract used was neutralized and a dose corresponding to 20 to 100 Gm. of liver was given. Such a dose, administered every few days or few weeks according to the severity of the disease was sufficient to produce the maximal reticulocyte responses. Intramuscular, rather than the intravenous, injections were advocated. Richter et al (*J. A. M. A.* 98: 1623, 1932) have made and used orally an extract of the liver of horses after Minot's "fraction G" method, and found it quite as valuable in the treatment of pernicious anemia as a similar extract of beef liver. Furthermore, an extract of the liver of fish has been made and

tried by Conner (*M. Clin. N. Amer.* 15:1463, 1931-32) in the treatment of this disease and found beneficial. The value of the ingestion of 480 Gm. of fresh ox brain daily by nine patients with pernicious anemia who also had degeneration of the cord, has been observed and reported by Ungley (*Lancet*, 1:227, 1932). In four, a marked improvement of the nerve disorder was noted, in two a slight improvement, and in three a failure to respond was found. The corpuscle count, however, diminished during the treatment. Three patients with pernicious anemia observed by Gibson and Fowler (*Arch. Int. Med.*, 50:124, 1932) have ingested 100 Gm. of liver daily for seven to nine and a half years. A failure to consume a sufficient amount of this food was found to cause relapses in two of the patients. A nephritic condition was observed in one patient and this was thought due to the excessive ingestion of nucleoprotein.

All types of nephritis have been found very prevalent in Trinidad, B. W. I., by Clark (*Trans. Roy. Soc. Trop. Med. and Hyg.*, 26:301, 1932). These are thought due to the ingestion of tannia and other aroid tubers by the people, because these foods are consumed in large amounts. More evidence was obtained by the experimental production of acute, sub-acute, and chronic nephritis in rats by feeding them these tubers in a raw or partially cooked condition. Keutmann and McCann (*J. Clin. Investigation*, 11:973, 1932) have observed the effects of increasing the protein in the diet of four patients with chronic hemorrhagic nephritis. An increase of from 40 to 200 Gm. of protein, or twenty-five per cent of the total food, was made. As a result there was not only a clinical improvement in the patients, but also an increase of weight, a reduction of anemia, and a maintenance of normal blood pressure. The effect of food and salt on nephritic edema has been observed by Lashmet (*J. Amer. Diet. A.*, 7:224, 1931) and considered due to an extrarenal cause, by which there is a retention of sodium chloride and water. Alkaline ash foods were observed to increase the edema, and therefore a low protein, low salt, and a neutral ash diet was advised. A study of endemic nutritional edema in some patients has been reported by Youmans et al (*Arch. Int. Med.*, 50:843, 1932). An inquiry into the food consumed by these patients revealed a very low nutritional level, inasmuch as only 20-50 Gm. of protein, 26-79 Gm. of fat, and 48-148 Gm. of carbohydrates were consumed. Such a low food consumption did not produce signs that commonly occur in patients during a famine, and except for the edema and a slight anemia, indications of severe undernutrition were absent.

IX. Obesity, Diabetes, and Carbohydrate Metabolism

Exact observations on measures to reduce a few obese patients have been described by Wilder, Smith and Sandiford (*Ann. Int. Med.*, 6:724, 1932). In records of the metabolism taken after two hours of light and severe exercises, the heat production was not diminished below the basal level. The food consumed contained the essential protein, vitamins, and minerals, and the amount approximated the basal requirements for twenty-four hours. This food did not produce a regular loss of weight however; in fact, the weight often remained stationary for twenty-eight days, or even increased. Such a peculiarity was ascribed to the retention of fluid. The administration of insulin for twelve to thirty days produced a carbohydrate intolerance and glucose tests similar to those of diabetes mellitus. In another article on the treatment of the obese, Lyon and Dunlop (*Quart. J. Med.*, 1:331, 1932) have found that a diet of 1000 calories was sufficient to bring about a satisfactory loss of weight, and especially so if the carbohydrate food was reduced. In a comparison of this dietetic treatment with thyroid treatment, it was found that 9 Gm. of the drug were required to produce the same result. The reduction of weight was thought due to the loss of fat and fluid. Keeton and Dickson (*J. Clin. Investigation*, 11:846, 1932) have tried the effects on fat patients of various reducing diets. One was composed of 90 Gm. of protein and other food to fulfill the basal requirements, another of 90 Gm. of protein and other food thirty to forty-eight per cent below the basal level, and a third of only 14 Gm. of protein and other food thirty per cent below the basal level. Under these variations of food consumption, and irrespective of the protein intake and nitrogen balance, the patients lost weight when the amount was below the basal requirements. They felt uncomfortable also when consuming the low protein diet. Moreover, Hemmerdinger (*Bull. Soc. sci. d'Hyg. Aliment.*, 20:359, 1932) has observed that in the reduction of the obese an inadequate consumption of nitrogenous food may be injurious; and has classified foods according to their obesity coefficient, with a ratio of calories to protein per 100 Gm. of food. On this basis, boiled beef, tongue, veal, fish and skim milk cheese gave values below ten, but carbohydrate and fat food had high coefficients. In an article on the menace of obesity, Bulmer (*Brit. M. J.*, 1:1024, 1932) has pointed out that overweight after the age of thirty-five increases the general mortality; and is often caused by the ingestion of too much carbohydrate food. Diabetes is generally the penalty of obesity, and fatal diseases of the heart, arteries, kidneys, or liver occur much more frequently in fat patients than in those of normal weight.

The prediabetic state has been studied, treated, and described by Tyner (*J. Lab. & Clin. Med.*, 17:456, 1931-1932). Tests of the urine and blood of these obese patients before they reduced were indicative of a carbohydrate intolerance; but after several years of restricted diet,

by which the patients were reduced, the same tests showed healthier conditions. Sellheim (*Fortschr. d. Med.*, 50: 553, 1932) has reported on the occurrence of diabetes during pregnancy. Before the introduction of insulin, fifty per cent of the embryos died in utero and thirty per cent of the mothers on delivery, but with it, the blood sugar could be maintained at a normal level, and few deaths occurred. Sometimes the diagnosis of diabetes in this condition was difficult, for while there was glycosuria, an increase of blood sugar above 130-150 mg. per 100 cc. evidently was prevented by the hormone of the corpus luteum. A study of diabetes in childhood has been made by Fleming et al (*Glasgow M. J.* 37: 314, 1932). They found from a survey of the patients before and after the use of insulin that the mortality was reduced from ninety to twenty-five per cent; and the deaths were largely the result of coma from insufficient insulin. The food consumed was fifty per cent above the basal requirements, and composed of a moderate amount of carbohydrate. If coma developed, a large amount of fluid was given and antiketogenetic treatment adopted. A significant study of the effects of various diets of about 2000 calories on diabetics has been described by Schloss (*Deutsche Arch. f. klin. Med.*, 173: 657, 1932). One diet was composed of fat and carbohydrate, another of protein and carbohydrate, and a third of normal food. Groups of patients consumed the normal diet first, one without fat afterward, and finally one without protein. Then the groups reversed the diets; and during the consumption of each diet, the conditions of the patients and their sugar levels were observed. Abstinence from fat often caused a slight metabolic shock; but afterward, such a restriction generally relieved the ketoses and reduced the glycosuria. On the other hand, abstinence from protein did not alter glycosuria or blood sugar and ketoses sometimes occurred again. A change from the normal diet to food without protein brought about the most rapid decrease of glycosuria, but only for a short time, and the blood sugar was not affected. Either one of the two restricted diets was found more beneficial than all three diets. Young patients fared best on the diet without fat, but elderly patients and those subject to thyrotoxicosis were benefited by the diet without protein.

The use of a high carbohydrate diet in diabetes is advocated by Graham and Clark and Roberton (*Lancet*, 2: 990, 1932). For, on a diet of 70 Gm. of protein, 125-150 Gm. of fat, and only 40-50 Gm. of carbohydrate daily for six years, fifteen patients required insulin. But after a year on a diet of the same protein content, the fat reduced to 100 Gm., but the carbohydrate gradually increased to 100 Gm. and a corresponding increase of insulin, four of the patients required less, two the same, and nine more insulin. Subsequently, however, on a diet still further increased by the addition of 10-40 Gm. of carbohydrate, seven of the twelve patients required less insulin than they did on the low carbohydrate diet. In general, those in whom the disease was the most severe were the most benefited by an increase of carbohydrate food. An explanation of the value of the high carbohydrate diet in diabetes has been made by Bang (*Acta med. Scandinav. suppl.* 50: 202, 1932). On the low carbohydrate diet, there was not only a ketonuria but also an increase in the urobilin content of the urine. These changes were attributed to a disorder of the liver, but in patients who consumed about 150 Gm. of carbohydrate a day less fat and protein were required, the liver functioned normally, and the carbohydrate metabolism improved. Motzfeldt (*Acta med. Scandinav.*, 77: 463, 1932) has observed that true diabetic blood sugar curves were given by a patient suffering from a disease of the liver. The sugar in the blood and urine was reduced as the disease of the liver was improved, and was little if at all influenced by the administration of insulin.

KNOWING RODENTS, BIOLOGISTS HELP FIGHT SPOTTED FEVER

Spotted fever, a dangerous disease of human beings, though carried by a tick, would never reach man or domestic animals if it were not for wild mammals, say specialists of the Department of Agriculture. In the brief life history of the wood tick, they explain, there are four distinct stages—egg, larva, nymph, and adult. The female lays her eggs on the ground sometimes as many as 4,000. After several weeks the eggs hatch and the larval ticks crawl up blades of grass or other low vegetation.

At this point in the tick's life cycle the mammals become an essential source of food. The larvae attach themselves to some passing animal, usually a rodent, feed on it for 3 to 8 days, drop off, and seek shelter. After remaining inactive for several days, they molt and emerge as nymphs. These, too, attach themselves to rodents or other small mammals, feed for a few days, drop off, molt, and after about two weeks emerge as adults, the familiar wood tick or dog tick. The next season these adults attack larger animals, native and domestic, and man, and if infected they convey spotted fever to the host. The life cycle is completed in one to three years. Only the adult tick is known to bite man.—Excerpt from the *Bulletin of the U. S. Dept. of Agriculture.*

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 19341

HEMORRHAGIC PLEURAL EFFUSION ASSOCIATED WITH A LEUKEMOID BLOOD PICTURE

MEDICAL DEPARTMENT

PRESENTATION OF CASE

DR. RICHARD P. STETSON: The first case is that of a sixty year old white American widow who was first seen by me in February of this year.

She gave an interesting history of a series of benign tumors, the first one in 1908, when she had multiple fibroids removed and a hysterectomy done. In 1915 she had some sort of benign tumor removed from her right breast. In 1929, following an acute upper respiratory infection, she had a brief period of sacro-iliac pain which probably does not come into the picture but is of some interest. In 1930 she had an epithelioma of the face removed. In November, 1929 she noticed a painless lump in the left breast. Nothing was done about this for five months; then it was removed at a New Haven hospital by Dr. Verdi, who made a clinical diagnosis of carcinoma of the breast and performed a radical mastectomy. Microscopically on initial examination and reëxamination no evidence of malignancy was reported.

She never completely recovered strength from the time of that operation until she went in 1931 to a doctor who gave her some pills containing arsenic trioxide 1/60 of a grain. She took these three times a day for a period of slightly over a year. In February, 1932 she was found to have a red cell count of 3,500,000 and 16,000 white cells.

In December, 1932 she went to the New Haven hospital. At that time a large spleen was detected and a liver which came about three centimeters below the costal margin. The blood showed the same total count, 16,000, but there was a large percentage of immature white cells. The smear, as far as the red cells are concerned, was interesting in that it had many immature red cells and reticulocytes from 9 to 14 per cent at various examinations. The red cell count was about 3,500,000. She had a little hypertension, 170/60, and perfectly definite mitral stenosis. The question was raised at that time as to whether or not it might be possible that the arsenic over a continued period of time had produced an irritative picture of the blood. She was then put on ventriculin with iron and improved remarkably. The blood count rose so that in February it was 4,700,000, the hemoglobin 90 per cent Sahli, the white cell count 13,000, of which 48 per cent were mature polymorphonuclears and 19 per cent either atypical mononuclear cells or myelocytes. At that time the reticulocytes were 11 per cent.

Three weeks later, in the middle of March, she developed cough and dyspnea. She was seen the middle of April, at which time she had a massive pleural effusion on the right side. Twenty-eight ounces of bloody fluid was withdrawn then and she was referred to the hospital.

In the meantime her spleen had enlarged so that it extended about 6 centimeters below the costal margin and the liver came to the crest of the ilium.

Her course in the hospital was progressively downhill and was characterized by a progressive anemia, progressive and extreme weakness and loss of weight, with no sudden episodes and no particularly noteworthy occurrences. About a week before death she had a fall in blood pressure, which had been ranging from 160 to 170, down to 128. Coincidental with that the presystolic murmur of mitral stenosis disappeared. She had some high voltage x-ray and the fluid did not recur. She developed a pleural friction rub on both sides and at one time I think there was a pericardial friction rub.

DR. GEORGE W. HOLMES: This film was taken before tapping and of course shows dullness throughout the lower half of the right lung field without much displacement of the heart. If this were fluid and nothing else one would expect more displacement of the heart than we see there. There is nothing in the lung other than what we see in the right base. In the lateral view there is a dark area between the mass and the spine which might represent the edge of the involved lung. The free fluid I think would go back through that dark area.

The film taken after tapping shows a marked decrease in the dull area with still some fluid along the axillary borders, then this shadow which is not visible in the other film.

CLINICAL DISCUSSION

DR. HOLMES: The shadow in the chest after tapping could represent consolidation of any kind. There is nothing characteristic about it. It corresponds roughly with the lobe and probably represents some form of consolidation in the lower lobe. It might even represent a collapsed lung. I do not see anything on which to make a diagnosis of tuberculosis.

This film of the pelvis shows an area of dullness on the left side which might be a calcified fibroid with calcification in the ovary. There is no evidence of metastatic disease of the bone,

only a slight arthritic change which one would expect in a woman of her age.

DR. STETSON: In the differential it is perhaps of interest to know that Dr. Minot saw the blood smear—I showed him the smear without telling him anything about the case—and his impression was that it was a myelogenous leukemia of the type that is described in the literature as chronic myelosis. With the history of radical amputation of the breast and a clinical diagnosis of malignancy I felt that the diagnosis of metastatic malignancy outranked that of myelogenous leukemia.

DR. HOLMES: The x-ray treatment was given with the idea that the lesion might be lymphoma and the dose which we gave was small,—enough to affect a lymphoma but not enough to affect a carcinoma.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Metastatic carcinoma, from the breast?

DR. RICHARD P. STETSON'S DIAGNOSES

Metastatic carcinoma, from the breast?
Rheumatic heart disease; mitral stenosis and regurgitation.

ANATOMIC DIAGNOSES

Metastatic carcinoma involving the pleura, the parietal pericardium and the bronchial glands.
Myelogenous leukemia.
Leukemic infiltration of the liver and spleen.
Bronchopneumonia.
Pleuritis with hemorrhagic effusion.
Mitral stenosis.
Infarction of the left adrenal.
Chronic vascular nephritis.
Arteriosclerosis, slight aortic and coronary.
Submucous lipoma of the cecum.

PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY: There is very obvious difficulty in trying to make all the findings fit under any one diagnosis. Metastatic malignancy certainly seemed an excellent bet. It might possibly account for the presence of the large number of immature white cells in the blood stream and the anemia, although I think when you have a real displacement anemia the x-rays of the long bones ought to show something pretty definite, should they not, Dr. Holmes?

DR. HOLMES: Yes.

DR. MALLORY: Very marked enlargement of the spleen would not fit well into that picture, however. If one tried to fit it all into leukemia it would be hard to explain the marked pleural effusion.

The autopsy showed in gross very extensive metastatic carcinoma limited to the right lung and pleura. There were perfectly typical nodules with depressed umbilicated centers; no question whatever from the gross appearance that they were carcinomatous rather than any other type of tumor.

Microscopic examination substantiated that. It seems to be an adenocarcinoma and could perfectly well have come from a tumor of the breast which was amputated. The sections of the breast, however, which were sent on to us by her surgeon show no evidence of malignancy. We found no other possible primary source however.

In addition we found a very much enlarged spleen, a slightly but definitely enlarged liver, slight but generalized lymph node enlargement and a very marked degree of hyperplasia of the bone marrow.

It is somewhat difficult to rule out entirely metastatic deposits in the bones. In our average autopsy we cannot cut into every bone in the skeleton of course. In this case however we did examine a number of vertebrae, the sternum, several ribs, a femur and a tibia, and in none of these areas did we find any evidence of metastatic carcinoma grossly or microscopically. In all of them there was very marked hyperplasia of the bone marrow.

I made some smears of the bone marrow and spleen at the time of autopsy and I will attempt to show you one of them here. This is an oxidase reaction of an impression preparation of the spleen. You can see the very high percentage of black oxidase-positive cells. With an oil immersion one finds that the nuclei in them are almost all round, very occasionally horseshoe shaped. A few, but a very small proportion of them, are mature leukocytes. The vast majority of them are immature leukocytes or myelocytes. Also there are occasional cells, not clearly shown in this preparation, which are multinucleated and might well be megakaryocytes.

The smears from the bone marrow showed an essentially similar picture with a very high percentage of myelocytes. This section is from the femoral marrow and shows very extensive replacement of fat tissue by hematopoietic elements the very great majority of which are in the white cell series, although there is also a little red cell formation going on. The megakaryocytes are very numerous.

The most surprising finding histologically in the autopsy was in the liver. Scattered throughout the liver I think you can see large clusters of nuclei. Here is one with six or seven nuclei. Each one is a megakaryocyte, and this single section of liver must have in it several hundred megakaryocytes. They are all lying in the sinusoids, apparently quite free. There are a few myelocytes and still more immature white cells in connection with them, but as a whole the evidence of leukemic infiltration is very slight except for these extraordinary numbers of megakaryocytes.

The spleen and lymph nodes also show a very high proportion of megakaryocytes, although nothing like the liver.

We have a spleen on one case of myelogenous leukemia. Some of you have probably seen it. It was removed at splenectomy I think thirteen or fourteen years ago, a case of Dr. Minot's. The patient is still in excellent health, although she still has a blood picture of myelogenous leukemia. That spleen when it was removed had grossly a number of small white nodules two to three millimeters in diameter scattered on its surface and throughout its tissue. It looked in gross almost like the spleen of Hodgkin's disease, the so-called porphyry spleen. On section it shows a marked myeloid infiltration and all of those white nodules which were noticed in gross turned out to be foci of megakaryocytes, sometimes thirty or forty in a single field. Scattered megakaryocytes in the spleen and other organs are not very unusual in myelogenous leukemia and may be found in normal people, but large numbers such as in these two cases, Dr. Minot's and this case under discussion to-day, are very unusual. I have shown the slides to a number of people and they have never seen anything like it.

I think it is interesting to speculate a little as to what they may mean. One school of opinion regards leukemia as a tumor the type of cell of which is a primitive bone marrow cell. It is not unreasonable that those cells should differentiate more than one way and from the stem cells might arise in some cases considerable numbers of megakaryocytes as well as myelocytes, so these large numbers of megakaryocytes might be regarded as foci of tumor in which the differentiation happened to run in that one direction. The other possibility is of course that they have been mechanically filtered out of the circulating blood. A review of the blood smears in this case does show megakaryocytes. On the other hand the liver is the least likely place for that filtration to occur. The cells were being formed in the bone marrow. They would have to pass through the capillaries of the lung, then back into the general circulation. I have not succeeded in identifying any in the alveolar walls.

A PHYSICIAN: This is the fifth case of combined carcinoma and leukemia I know of. I have seen four cases with myelogenous leukemia and carcinoma of the breast in women. That is a rather unusually high percentage, since myelogenous leukemia is so very rare itself. The four were in the left breast, I think. This is in the right. I do not know whether there is any significance.

A SURGEON: Did microscopic examination of the adrenal show anything?

DR. MALLORY: One adrenal showed very extensive hemorrhagic necrosis of the medulla. It was completely necrotic. I think it represents infarction of the adrenal, and it is perfectly possible that that is related to the fairly sudden drop in blood pressure noticed clinically, although that is guesswork.

A PHYSICIAN: There is no question of the diagnosis of myelogenous leukemia?

DR. MALLORY: I do not see how there can be. Carcinoma of the breast could only explain the blood picture provided practically all the bone marrow were actually displaced by cancer tissue. That possibility we have ruled out.

DR. STETSON: It is interesting that she improved both hematologically and clinically between December and March under treatment with ventriculin and iron but no x-ray treatment.

Another thing that is interesting is that with all these megakaryocyte nuclei in the liver none were seen in the blood. Some may be found on more careful search, but we looked pretty carefully and saw no cells suggesting megakaryocytes.*

*On reëxamination a few definite megakaryocyte nuclei have been found in the blood smears.

FURTHER DISCUSSION OF CASE 19101, PUBLISHED MARCH 9, 1933

MEDICAL DEPARTMENT

PRESENTATION OF CASE

DR. RICHARD B. CAPPS:* This is the case of a sixty-four year old white English housewife who entered the hospital for abdominal pain of one year's duration.

Fifteen years before admission she developed pain in the left side of the abdomen. She was operated on and a six pound tumor of the left kidney removed. At the same time she probably had a hysterectomy done. After this she was perfectly well until one year before admission, when she had an attack of pneumonia. Shortly after her recovery from the pneumonia she developed attacks of midepigastric pain which was sharp and stabbing in nature and radiated to the back between the scapulae. These attacks occurred once or twice a month, were moderately severe, and were, she thought, brought on by food. She also had nausea brought on by meals. Ten weeks before admission she complained of pain in the low back region which continued, although it was not very severe. For a week before admission she had shooting pains in both legs. She had lost fifteen pounds in the past year and had had nocturia two to three times a night during this period. Otherwise the past history was negative.

On admission she was a well developed, rather obese elderly woman with coarse hair on her face. She said that she had had to shave recently. The hair on her head was coarse and

*Recently senior interne on the East Medical service.

scanty. Her spine was kyphotic. The heart was slightly enlarged, the blood pressure slightly elevated. The abdomen was negative except for the scar of the nephrectomy. Pelvic examination showed no uterus, and no cervix was felt. Both tibiae were bowed anteriorly and thickened.

Laboratory examinations showed that she had a white cell count of 15,000. The temperature was 100° and the non-protein nitrogen was 32. The basal metabolic rate was —5. We thought possibly she had a mild myxedema. Calcium and phosphorus were normal, phosphatase 10 units.

X-ray examination of the long bones confirmed the diagnosis of Paget's disease. A barium enema, a gastro-intestinal series and a Graham test were negative.

She was admitted first on the Surgical service and then shortly transferred to the Medical service. While in the Medical ward she began to have attacks of pain and following the first attack developed a little visible jaundice. The liver function showed 90 per cent retention of the dye although the icteric index was only 10. The tests were repeated two days later with the same results. She began to run a temperature swinging from 100° in the morning to 102° in the afternoon. She developed a little tenderness in the right upper quadrant, although the liver was never definitely felt. After two weeks she became more jaundiced and the icteric index rose gradually to 50. She had bile in the urine and the stools were brown. After she had been in the ward for three or four weeks she developed some signs of consolidation in the right mid-chest. Her temperature continued the same as before. We thought she had a mild pneumonia, but after two or three days the signs changed to those of fluid. A chest plate at that time showed a considerable amount of fluid in the right chest. A chest tap was done and an amber colored, slightly cloudy fluid was removed with a low specific gravity, 1.013. She felt better.

We were unable to make a definite diagnosis. It was felt that possibly she had cirrhosis with fluid in the right chest and possibly a solitary liver abscess. X-rays were not very satisfactory because she was too sick to coöperate very well. On one occasion both diaphragms were said to be fixed. The x-ray interpretation was that she had something below the diaphragm which was producing the chest signs. She was treated with intravenous glucose and a high carbohydrate diet, but continued to lose ground. She began to vomit, and failed gradually until she died.

Clinical Discussion

Dr. Walter Bauer: Her liver function was only slightly reduced?

Dr. Capps: Yes. A galactose tolerance test was done and was normal.

Dr. George W. Holmes: What was the report on the Graham test?

Dr. Capps: That was negative. It was repeated twice. The first time it was questionable.

Dr. Holmes: By negative do you mean it did not show anything, the gall bladder was normal?

Dr. Capps: Yes.

Dr. Bauer: Did you consider metastatic malignancy of the liver, the primary being the original kidney tumor?

Dr. Capps: We thought that fifteen years was rather a long interval. We did not consider that very seriously.

Dr. Holmes: I cannot find the films of Paget's disease.

Dr. J. H. Means: It was chiefly in her left shin.

Dr. Capps: Yes, I think in both shins and the lower lumbar spine.

Dr. Holmes: This film is one that was taken in the routine manner and this one is a portable, probably taken after some respiratory upset. I should think that this film would be interpreted as negative; possibly a little elevation of the right diaphragm. In this next film there is very definite elevation of the diaphragm and not much else.

In this film there is some thickening of the bone and some prominence of the trabeculae along the sacro-iliac articulations. How old was the patient?

Dr. Capps: Sixty-four.

Dr. Holmes: I should hardly like to make a diagnosis of Paget's disease on that. It looks like it, but I think in an old person you can get almost as much as that without Paget's disease. She shows some thickening on the inner table of the skull, but that is also common in old people and does not necessarily mean Paget's disease.

Dr. Chester M. Jones: Do any of those films show the liver?

Dr. Holmes: You can see the edge of the liver there. It is rather small if anything, and that is possibly one of the films that showed the gall bladder finally. There are not many conditions that give jaundice and a negative Graham test.

Dr. Bauer: Not with the dye retention and the lowered icteric index that she had. Those findings should make us consider intrahepatic disease such as malignant disease.

Dr. Capps: Of course the Graham test was done at admission and before she became jaundiced. She was not clinically jaundiced until she had been in the ward for about ten days.

Dr. Holmes: That might explain it. It would have to be a non-obstructive jaundice to give a negative Graham test.

Dr. Tracy B. Mallory: Dr. Means, have you anything to add?

Dr. Means: She was under my care for part

of her stay. I do not think I can add very much to what Dr. Capps has stated. There are two things that might be mentioned. One is the possibility of a metastatic hypernephroma after all these years. It is my belief that it is possible that they do metastasize as late as that. It could be that, but we have no proof that it is. Then the possibility of hormonic signs related to the adrenal is of some interest. She did have a pretty good beard as Dr. Capps said and as I remember it. One wonders if that was connected with the disease in her adrenals. It is my impression that the so-called hypernephroma never did produce true hormonic signs. Indeed the authorities are not absolutely clear in their minds that the tumor originates in the adrenal gland at all.

DR. MALLORY: The swing of opinion at the present time is very definitely against its having anything to do with it.

DR. MEANS: It is not very easy to relate this kidney tumor with her present hypertrichosis.

DR. MALLORY: Can you add anything, Dr. Jones?

DR. JONES: I cannot add anything, but it is a very singular combination, a relatively small liver and moderate jaundice, a very high diaphragm, and normal colored stools apparently. The stools were dark, were they not?

DR. CAPPS: Yes.

DR. JONES: If all these findings are correct it would seem that a cirrhosis, not biliary but toxic cirrhosis would be the picture that would fit into this best, with a diffuse intrahepatic process giving a great deal of dye retention and at the same time associated with right upper quadrant pain and also associated with right hydrothorax, which can perfectly well be a minor episode. I should think the findings would fit perfectly well with toxic cirrhosis. I do not see how one can fit it in with the previous story of right sided tumor. There is no reason to believe from the story that she had cirrhosis, but with the facts no other liver condition would fit it so as well as that. If it were malignancy with metastatic involvement of the liver we should not have that combination of moderate jaundice and very high dye retention. Ordinarily the findings would be just reversed.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Paget's disease.
Biliary cirrhosis.
Liver abscess?

ANATOMIC DIAGNOSES

Operative wound, healed: left nephrectomy.
Recurrent papillary adenocarcinoma of the left kidney with metastases to the heart.
Undifferentiated carcinoma in the adrenal, the liver, the lungs and the bone marrow.
Pleuritis with effusion, right.
Pericarditis, acute fibrinous, with slight effusion.
Nephrosis, slight.

PATHOLOGIC DISCUSSION

DR. MALLORY: It seemed impossible to make a clinical diagnosis in this case, and our findings at autopsy explain why it was not possible but also fail to explain any of the symptoms that she had.

In the stump of the pedicle of the left kidney, which had been removed fifteen years previously, was a little recurrent tumor of which I will show you the section. This is a markedly papillary type of adenocarcinoma with deep pink staining cells, not a hypernephroma at all. There are none of the markedly vacuolated big clear cells that are typical of the so-called Grawitz tumor. It is a papillary adenocarcinoma which so far as the histology is concerned could equally well be primary in the kidney, the ovary or the thyroid. Those are the three likely regions. The fact that she had had a renal tumor removed and that this tumor was found apparently recurrent at the site of the previous operation makes it practically certain that this is a recurrence of the original renal tumor. These tumors do metastasize, and here is a metastasis of the same type, markedly acidophilic cells and adenomatous arrangement with a definite tendency to papillary projections. This lay in the myocardium, and was the only metastatic tumor we found which in appearance bore any relationship to the recurrent tumor in the renal bed.

On the other hand she had carcinoma everywhere, but it is entirely different in appearance. Here is her liver. It is filled with metastatic carcinoma, but this is a very undifferentiated adenocarcinoma. The cells are not acidophilic, there is no tendency to papillary projection and except for the epithelial character it bears no resemblance to the two tumors which I have already shown you. Tumor of this sort was found scattered in a wide variety of places. Metastases were most numerous in the liver, but we also found them in the lungs, the thyroid and in various lymph nodes. One of the areas where this type of tumor was found was the adrenal, and nearly all of the adrenal tissue has been destroyed by it. Here is a little bit of persisting adrenal cortex, but the greater portion of the adrenal cortex and of the medulla has been replaced by this highly malignant and undifferentiated tumor.

A PHYSICIAN: How much liver tissue was left?

DR. MALLORY: A fair amount. There were

numerous small metastases in the liver, but I should not say the liver metastases were particularly extensive.

It seems to me there are two possibilities to this case. It may represent recurrence and metastasis from the original tumor of the kidney, in which case one metastasis, perhaps a very early one occurring years ago, differentiated very well and grew very slowly, that being the one in the heart. We must then assume that at some later time there developed a sudden change in the character of the tumor and a rapid extension in undifferentiated form.

The other possibility is that we are dealing with an entirely separate new tumor primary somewhere else, and inasmuch as one of the largest foci of this second type of tumor was in the adrenal that might well be its primary source. The hirsutism and other suggestions of primary adrenal tumor would offer some support for this hypothesis.

DR. BAUER: Do you think the latter is more probable?

DR. MALLORY: Yes, I am inclined towards the latter. I do not think it would be possible to prove it in the face of a known primary tumor of the kidney, but it fits that end of the clinical picture perfectly well. There was no explanation for the peculiar function or failure of function of the liver.

DR. JONES: It certainly is extraordinary.

DR. HOLMES: Did you investigate the bones at all?

DR. MALLORY: We were not allowed to examine anything except the pelvis and the vertebrae, and we could not make out any definite evidence of Paget's in them.

DR. HOLMES: The changes were not due to metastases then?

DR. MALLORY: In the area that we examined there were metastases, Dr. Holmes.

DR. HOLMES: The differential diagnosis between Paget's and metastatic malignancy is rather difficult. Were there metastases in the lungs or in the pleura, or both?

DR. MALLORY: Both. Most of them were in the visceral pleura on the surface of the lung, although some were deeper, within the lymphatics themselves.

DR. HOLMES: The x-ray seems to fail regularly in detecting metastasis in the pleura.

DR. JONES: Is that not a rather low specific gravity, 1.013? The specific gravity obtained from fluid due to carcinoma of the pleura is apt to be higher, is it not?

DR. MALLORY: Dr. Donald King has been checking up pleural fluids recently and finds every possible gravity with every possible etiology as far as I can make out.

DR. ALLEN G. BRAILEY: Do you think it is possible to attribute this hypertrichosis and so forth to hyperfunctioning of the adrenal cortex?

DR. MALLORY: I cannot say it is impossible, although so much of the normal adrenal was destroyed that I should not expect to get evidence of overfunctioning from it, unless the tumor were composed of cortical tissue.

DR. MEANS: There is no evidence of hyperfunctioning of any endocrine gland that I know of other than the thyroid without a definite tumor. We have looked for diffuse parathyroid hyperplasia and have not found it. It always turns out to be a tumor. The same thing applies to other glands. In other words, one does not find a condition analogous to the thyroid of thyroid goiter in any other endocrine organ so far as I know.

DR. BAUER: Certainly in the case of the adrenal you never get adrenal insufficiency, do you?

DR. MALLORY: One difficulty is in definitely differentiating hyperplasia from neoplasia. As far as the parathyroid is concerned it can be claimed that those are not tumors. I do not see how to separate them with certainty.

DR. MEANS: It is a matter of enlargement of one of them, and the others are normal.

DR. MALLORY: That is true of all the cases we have seen. It might be claimed, however, that the condition is one of hyperplasia of a single gland.

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A CODE OF FAIR COMPETITION

IN the adoption of plans for the conduct of business designed to improve conditions in this country, the underlying principle involved is "Fair Competition." This means, in theory, that the cost of operation shall fall evenly on competitive industrial organizations with the apparent purpose of giving all forms of business even chances for success. The desired end is apparently to increase and distribute purchasing power among larger numbers of consumers by reason of more employed operators.

Medicine is not required to participate in the regulation of manufacturing and distributing concerns because of the impossibility of adjusting service to hours or emergencies, but doctors have a responsibility in their dealings with certain supply houses respecting fair competition because a practice exists which is designed to concentrate the sale of certain articles among dealers who will pay the prescribing doctor a percentage of the cost of the article sold.

As an illustration a doctor gave a letter to a patient to be delivered to a dealer calling for a certain type of truss. The patient paid the required price and the doctor received the dealer's check for his part in the transaction.

This practice of a commission to doctors for prescribed articles is not unique and is reported to exist in Boston. Several dealers in supplies and apparatus used by physicians will not descend to this practice and feel that those who do are being encouraged by the doctors.

Fee splitting among doctors is an unholy alliance. This commission paid on doctor's orders is a close relation to fee splitting and is a barrier to fair competition.

The medical code of ethics should be as binding as the edicts of the NRA.

Specific instances should be reported to the officers of the State Society.

THE MASSACHUSETTS GENERAL HOSPITAL

ONE HUNDRED AND NINETEENTH ANNUAL REPORT OF THE TRUSTEES

THE annual report of the trustees of the Massachusetts General Hospital for 1932 shows how well a great hospital with diversified interests has been able to meet and combat successfully the adverse tides of economic stress, with decreased income and yet with greater obligations to the community to be carried. A few figures from the Director's report will show how this situation has been handled. In the Outpatient Department more than 25,000 more visits were recorded than in 1931, the daily average number of patients having been 1024, an increase of 80 visits a day. More patients were admitted to the General Hospital, the average stay, however, having been reduced from 19 to 18 days. One hundred and eighty-one more patients were admitted to the Baker Memorial than in 1931, the average stay being 13 instead of 14 days. The Phillips House, on the other hand, as might be expected, has shown a considerable decrease in the number of patients.

In the face of this increased demand for service in general, the ordinary maintenance expenses for 1932 were $283,967.52 less than in 1931, and the extraordinary expenses $18,625.16 less. The receipts at the hospital from all sources were $171,761.82 less than in 1931. These savings have resulted from

A. Salary and wage cuts ranging from five to ten per cent.

B. The housing of nurses and others living outside the hospital, so far as possible, in unused private patients' rooms.

C. Discontinuance of the Phillips House kitchen, dining rooms, branch apothecary and store, these functions being taken over by the Baker Memorial.

D. Reduced cost of all commodities.
E. Reduction of the number of employees.
F. Closing of the Research Ward.
G. Centralization of telephone switchboards.

The construction needs of the hospital for the near future are the following:

1. A new ward and operating building, as provided by the will of Mrs. Harriet J. Bradbury.
2. A new Nurses' Home.
3. A building for male employees to house 150 men.
4. An additional story on the Moseley Building to provide increased accommodations for house officers and residents.
5. A Staff office building.
6. A garage for the parking of cars of Staff, patients, visitors, students and employees.
7. An x-ray building.
8. A laundry and workshop building off the grounds.
9. A country branch in Belmont on the site owned by the Hospital.

Among the deaths registered during the year are those of Dr. Henry P. Walcott, Honorary President of the Corporation, Dr. William L. Richardson, Dr. E. Wyllys Taylor, Neurologist-in-Chief from 1912 to 1926, and Dr. Nathaniel Allison, Chief of the Orthopedic Service from 1923 to 1929.

Among the Staff changes are the resignation of Dr. Lincoln Davis, Chief of the East Surgical Service since January, 1929, the appointment of Dr. Beth Vincent as Acting Chief of that Service, and the appointment of Dr. Harold L. Higgins as Chief of the Children's Medical Service. During the year Dr. W. Franklin Wood, Assistant Director in charge of the Baker Memorial, was appointed Director of the McLean Hospital.

Despite the curtailment of activities and the tightening of the belt, the main work of the Hospital has gone forward. Patients are cared for in increasing numbers and at decreased cost to themselves, and productive activity along investigative lines has continued.

As it is stated in the report, no great hospital such as the Massachusetts General can stand still. Either it must develop and increase its usefulness to the public or its deterioration will commence. The history of this Hospital from its beginning indicates that it has always met the demands for its services.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

GRAVES, ROGER COLGATE. A.B., M.D. Syracuse University College of Medicine 1918. F.A.C.S. Urologist to the Carney Hospital. Genito-Urinary Surgeon to the Pondville Hospital. Member of Staff of the Deaconess Hospital. Member of the Consulting Staff of Brockton, Quincy and Winchester Hospitals. Address: 12 Bay State Road, Boston. Associated with him is

KICKHAM, C. J. E. A.B., M.D. Harvard University Medical School 1927. Assistant Urologist, Pondville Hospital. Surgeon to Outpatient Department, Carney Hospital. Address: 12 Bay State Road, Boston. Their subject is "Cysts of the Prostate." Page 367.

VERMOOTEN, VINCENT. M.A., M.D. Johns Hopkins School of Medicine 1923. F.A.C.S. Instructor in Urology, Yale University School of Medicine. Assistant Professor of Urology, New Haven Hospital. His subject is "Metaplasia in the Penis: The Presence of Bone, Bone Marrow and Cartilage in the Glans." Page 368. Address: New Haven Hospital, New Haven, Connecticut.

YOUNG, HUGH H. M.A., D.S.M., F.R.C.S.I., M.D. University of Virginia Department of Medicine 1894. F.A.C.S. Clinical Professor of Urology, Johns Hopkins University Medical Department. Visiting Urologist, Johns Hopkins Hospital. Director, James Buchanan Brady Urological Institute. His subject is "Some Hermaphrodites I Have Met." Page 370. Address: Johns Hopkins Hospital, Baltimore, Maryland.

HAYDEN, E. PARKER. A.B., M.D. Columbia University College of Physicians and Surgeons 1919. F.A.C.S. Surgeon to Outpatients and Chief of Rectal Clinic, Massachusetts General Hospital. His subject is "Anal Fistula." Page 376. Address: 270 Commonwealth Avenue, Boston.

GIBBS, C. B. F. B.S., M.D. Syracuse University College of Medicine 1919. Assistant Professor of Medicine, University of Rochester School of Medicine. Associate Physician, Rochester General Hospital. Address: 16 N. Goodman Street, Rochester, New York. Associated with him are

BUCKNER, ELIZABETH. Technician at Iola Sanitarium, Rochester, N. Y. and University of Rochester Medical School. Address: University of Rochester Medical School, Rochester, N. Y.

BLOOR, W. R. Professor of Biochemistry and Pharmacology and Associate Dean, University of Rochester Medical School. Address: Uni-

versity of Rochester Medical School, Rochester, N. Y. Their subject is "The Cholesterol to Cholesterol Ester Ratio in the Plasma of Diabetics with Advanced Arteriosclerosis." Page 384.

LENNOX, WILLIAM G. A.B., A.M., Sc.D., M.D. Harvard University Medical School 1913. Instructor in Neurology, Harvard Medical School. Junior Visiting Physician, Boston City Hospital. His subject is "The Multiple Causes of Seizures in the Individual Epileptic Patient." Page 386. Address: 911 Medical Building, Boston City Hospital, Boston.

COHEN, BENJAMIN. D.N.B., M.D. Tufts College Medical School 1931. Assistant Physician, Grafton State Hospital, North Grafton, Mass. His subject is "Treatment of Amnesia." Page 389. Address: Grafton State Hospital, North Grafton, Massachusetts.

BURNETT, FRANCIS LOWELL. S.B., M.D. Harvard University Medical School 1906. Assistant Dermatologist, Massachusetts General Hospital. Graduate Assistant, Peter Bent Brigham Hospital. His subject is "The Progress of Nutrition." Page 392. Address: 205 Beacon Street, Boston.

MISCELLANY

A RADIO MESSAGE PREPARED AND SPONSORED BY THE COMMITTEE ON PUBLIC EDUCATION OF THE MASSACHUSETTS MEDICAL SOCIETY FOR THE DEPARTMENT OF PUBLIC HEALTH

"A HEART TO HEART TALK"*

BY ROBERT S. PALMER, M.D.

The heart is a marvelous organ. Not only is it the source of that superhuman courage which distinguishes the heroes of grand romance; not only is it the seat of those tender emotions by which alone the poets live; the heart is in reality a marvel scientifically far more wonderful than in song or story. We look at Niagara Falls and see the limitless flow of water which makes that mighty spectacle. We see the vast engines turned by its unfailing power. Yet unseen and unknown to most of us, all the hearts of the United States pump almost as much blood daily, one hundred and thirty billion gallons. All these hearts of ours together develop enough energy to supply the city of Boston, seventy thousand horsepower. In a lifetime each heart completes two thousand million operations while your automobile after fifty thousand miles does only a tenth as much†.

What happens to these hearts? As a distinguished citizen of New York has it, "Let's look at the record." One heart in six fails. Heart and blood vessel disease leads all other causes of death and accounts for an untolled proportion of sickness and disability. What can we do about it? We believe the answer is individual preventive medicine, the common-sense rules of living which your own doctor will tell you, the prevention of disease by regular health examinations.

The first sort of heart disease is that with which a few people are born. Fortunately it is rare since very little is known about its causes and very little can be done to prevent it. So far as we know it tends to appear in certain families though the tendency is not a strong one. Injury or emotional shock to the mother before giving birth to her child is not a cause. While as yet nothing can be done to anticipate or prevent this type of heart disease, in some cases by careful living people suffering from it may accomplish long and successful lives. Such a person was Henry Gilbert the distinguished composer of American music who had a very severe form of this type of heart disease yet in spite of it lived to almost sixty years and enjoyed a very full and useful life.

In heart disease caused by infections or germs, prevention is most successful and this prevention must begin early. How does your child look? Is his color ruddy and glowing? Are his bones well covered with flesh? Pale children, thin ones, may be subject to rheumatism which is an extremely common cause of heart trouble. Early symptoms are frequent sore throats, growing pains, irritability. If marked nervousness appears, causing the child to drop knives and forks at the table, or if he has swollen, red and painful joints he is in immediate danger. If you want to insure a healthy heart for your boy or girl be sure that he or she is well nourished, gets plenty of rest both during the day and at night, and has ample outdoor air and sunshine. Take the child regularly to your family physician for examination.

Rheumatic infection causes most of the heart disease of children and young adults. At somewhat older ages a not uncommon cause of heart disease is syphilis. This disease is usually spread by sexual or other intimate contact with an infected person though rarely it may be acquired in other ways. Once the germs gain entrance to the body they spread widely. One of the places they are likely to attack is the heart and especially one of the large blood vessels leading from the heart. The valve is deformed and the heart muscle is injured. Because this attack is very slow and silent there may be few complaints to give the warning until the damage is done. The presence or absence of this disease, however, may be shown by a blood test. When you have your health examination be sure that your blood is tested. An early recognition of this condition will prevent much trouble later on.

The commonest heart trouble of the middle years and later is not infectious but is degenerative and is related to hardening of the arteries

*June 20, 1933, Station WBZ, 4:30 P.M.
†Statistics from Bush, V. and Read, W. D. "The Human Power Plant." The Technology Review, 34:159, Jan. 1932.

and blood pressure, those ghosts of ill health about which there is so much conversation and so little action. You are better off if you say and do nothing about either of them unless you know that your parents or grandparents were subject to these diseases. If they occur often in your family tree be sure you are not one of the fat ladies who spends her spare pennies on whipped cream laden islands floating in chocolate syrup—or one of the roundish gentlemen who uses the limits of his expense account on hearty breakfasts and big dinners. Overweight and a family tendency to heart trouble constitute a dangerous combination. It is worse if you also happen to be the irritable, worried, fretful sort, constantly struggling, always dissatisfied, always overambitious.

Your family history, your weight, your nervous habits are only three of many points which your doctor takes up at a health examination. He will also want to know about such simple things as your hours of sleep, and of work, the regularity of your meals, yearly vacations, monthly, weekly, and daily rest, kinds and quantity of exercise, and of recreation. He can then judge the degree of intelligence applied to your daily living. The doctor also will search for functional defects by asking for the presence or absence of various symptoms which may indicate changes in the heart and blood vessels or other organs of the body. From his examination he may or may not find evidence of some changes already present. But of the greatest importance in preventing the heart trouble of middle age is the correction of unhealthy habits of living, instruction in personal hygiene. The prescription may be much the same for most. More often than not it will be education in health consciousness.

Good health and prevention of degenerative heart and blood vessel disease mean regularity, balance, and reserve strength. Its greatest enemy is fatigue. Its strongest ally is eight hours' sound sleep, with twenty minutes' rest and relaxation during the day. The rhythm of a healthy man's waking life alternates between eight, not more than nine hours' work, and play which includes diverting interests and exercises. Concentrated week-end exercise with overeating and overdrinking is worse than none. Three equal periods of competitive sport each week and setting-up exercises of ten to fifteen minutes with forty minutes open air walking each day is the best combination. The healthy man's philosophy of living allows him to accept whatever comes with good-humored fatalism. You can recognize such a man when you meet him by his erect posture, his unlined face, his good humor and tolerance, above all by his enjoyment, his zest and appetite for life.

Finally, keep your mind off your health. Let your family doctor be responsible. See him regularly once a year.

ARRANGEMENTS FOR POSTGRADUATE MEDICAL INSTRUCTION BY THE MASSACHUSETTS MEDICAL SOCIETY

The Executive Committee on Postgraduate Medical Instruction of the Massachusetts Medical Society has appointed a Chairman on Postgraduate Instruction for each district. The various district chairmen have been nominated by each district society president. The chairman of each district will have charge of the organization of courses to be given during the fall, winter, and spring of 1933-1934.

Complete information in regard to the courses will be mailed to each resident member of the Massachusetts Medical Society on August 29, 1933. The district chairmen have full knowledge of the proposed Postgraduate Course and will be glad to give any additional information.

The following are the chairmen of each district:

District	*Chairman*
Barnstable	Dr. J. I. B. Vail 155 Main Street, Hyannis
Berkshire	Dr. Albert C. England and Dr. George S. Reynolds 7 North Street, Pittsfield
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Bristol South	Dr. Charles Shanks 645 Kempton Street, New Bedford
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Essex South	Dr. W. G. Phippen 31 Chestnut Street, Salem
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Middlesex North	Dr. F. P. Murphy 175 Central Street, Lowell
Middlesex South	Dr. C. E. Mongan 24 Central Street, Somerville
Norfolk	Dr. F. S. Cruickshank 1695 Beacon Street, Brookline
Norfolk South	Dr. David L. Belding Main Street, Hingham
Plymouth	Dr. H. A. Chase 129 West Elm Street, Brockton
Suffolk	Dr. F. R. Ober 234 Marlborough Street, Boston

Worcester	Dr. E. C. Miller 27 Elm Street, Worcester
Worcester North	Dr. C. B. Gay 62 Day Street, Fitchburg

LEROY E. PARKINS, M.D., *Secretary.*
Executive Committee
on Postgraduate Instruction.

MORTALITY RATES

Telegraphic returns from 85 cities with a total population of thirty-seven million for the week ending August 5, indicate a mortality rate of 10.6 as against a rate of 8.9 for the corresponding week of last year. The highest rate (20.5) appears for Wilmington, Del., and the lowest (4.7) for Yonkers, N. Y. The highest infant mortality rate (14.8) appears for Evansville, Ind., and the lowest for Fort Wayne, Ind., Schenectady, N. Y., Somerville, Mass., Springfield, Mass., Tacoma, Wash., Utica, N. Y., and Wilmington, Del., which reported no infant mortality.

The annual rate for 85 cities is 11.3 for the thirty-one weeks of 1933, as against a rate of 11.6 for the corresponding period of the previous year.—*Bureau of the Census.*

THE INTERNATIONAL ORGANIZATION OF CHEMICAL DOCUMENTATION

Questions concerning documentation have of late assumed more and more importance. Scientific and technical documents increase on all sides in such numbers that it becomes more and more difficult to gather useful material for the benefit of inquirers. There are many bodies that deal permanently with the registering, classing and diffusion of such documents. Now the coördination of the respective activities of these institutions on an international basis has become necessary in order to permit them to carry on their work efficiently.

As regards the province of chemistry a step was taken in 1932, in the scientific and technical sphere, by the activity of the International Office of Chemistry, created by international convention, and having its headquarters in Paris.

Its first act was the summoning of a Conference of Experts, which included the following persons: Messrs. F. Donker Duyvis, Member of the Council of Patents, The Hague; P. Dutoit, Professor at the University of Lausanne; F. Haber, Director of the Kaiser-Wilhelm Institut für Physikalische Chemie und Electrochemie, Berlin; E. Hauser, Member of the Academy of Sciences, Madrid; Ch. Marie, Secretary General of the Comité International des Tables Annuelles de Constantes, Paris; N. Parravano, Member of the Academy of Italy, President of the Comitato Nazionale di Chimica, Rome; G. Peny, President of the Federation of Chemical Industries of Belgium, at Brussels; J. C. Philip, professor at the Imperial College of Science and Technology, London.

The work of this Conference led to the adoption of a certain number of recommendations fixing the three principal tasks of the Office:

I—To render accessible to all interested persons the already existing documents, accumulated in the various centres, depots and collections.

II—To guide the chemical documentation which is in course of production, in such a way as to facilitate its registering, filing and diffusion, by methods found to be the best.

III—To insure coördination between the documentation relative to chemistry and that concerning other scientific knowledge in the field of international documentation.

Thanks to these varied operations, the users of such documentation will find that all over the world a practical and rational organization of literature respecting chemistry is being carried out systematically and progressively, hence likely to be more and more effectively adapted to their needs.

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR JULY, 1933

Scarlet fever continues its subsiding incidence from a peak early last year, the number of cases for July being lower than for the two previous years.

Anterior poliomyelitis was considerably above the normal prevalence for the month of July.

Whooping cough continues to be slightly above the normal incidence.

Diphtheria continues its downward trend, less than one-half as many cases being reported this month as for any other month in the history of the state.

Tuberculosis, both pulmonary and other forms, still shows no tendency to increase.

Typhoid fever shows the same low prevalence that has been in evidence for a number of months.

Measles, German measles, and chicken pox show about the usual prevalence for this season.

Lobar pneumonia, mumps, and epidemic cerebrospinal meningitis were reported about the number of times expected.

RARE DISEASES

Anterior poliomyelitis was reported from Auburn, 1; Beverly, 1; Boston, 45; Boxford, 1; Braintree, 2; Cambridge, 2; Canton, 1; Chelsea, 1; Everett, 2; Haverhill, 1; Lowell, 1; Medford, 1; Norwood, 1; Randolph, 1; Revere, 2; Somerville, 7; Sterling, 1; Woburn, 3; Worcester, 4; Total, 78.

Encephalitis lethargica was reported from Colrain, 1; Lawrence, 1; Pittsfield, 1; Winchendon, 1; Total, 4.

Epidemic cerebrospinal meningitis was reported from Adams, 1; Boston, 2; Methuen, 2; New Bedford, 2; Somerville, 1; Total, 8.

Malaria was reported from Brockton, 1; Dighton, 1; Fall River, 1; Medfield, 1; Total, 4.

Paratyphoid was reported from Newton, 1; Melrose, 1; Total, 2.

Pellagra was reported from Boston, 1.

Septic sore throat was reported from Boston, 6; Danvers, 1; Haverhill, 1; Lowell, 2; Malden, 1; Phillipston, 1; Quincy, 1; Revere, 3; Winchester, 1; Total, 17.

Tetanus was reported from Marblehead, 1; Maynard, 1; North Attleboro, 1; Wilbraham, 1; Total, 4.

Trachoma was reported from Boston, 3; Chelsea, 1; Total, 4.

Undulant fever was reported from Norton, 1.

MONTHLY REPORT FOR JULY, 1933

Disease	July 1933	July 1932	Average*
Anterior Poliomyelitis	78	5	23
Chicken Pox	342	429	355
Diphtheria	66	135	167
Dog Bite	733	655	671
Epidemic Cerebrospinal Meningitis	8	2	7
German Measles	35	23	49
Gonorrhea	580	605	510
Lobar Pneumonia	108	101	112
Measles	1164	1391	1162
Mumps	208	341	234
Paratyphoid	2	2	0
Scarlet Fever	418	599	386
Syphilis	348	349	235
Tuberculosis, Pulmonary	342	422	416
Tuberculosis, Other Forms	52	54	52
Typhoid Fever	20	20	26
Whooping Cough	654	579	567

*Average number of cases for July during the preceding five years.

THREE INTERESTING OLD MEDICAL AND PHARMACEUTICAL DOCUMENTS

In the historic collection of pharmaceutical and medical rarities and antiques recently acquired by E. R. Squibb & Sons, which forms the nucleus of their professional exhibit at A Century of Progress Exposition in Chicago, are several rare and unusual documents.

One of these is a certificate written in German on parchment and bound elaborately in a velvet covered folio, to which is attached a great seal encased in a walnut box. The seal is that of Emperor Leopold II of the Holy Roman Empire, and the document is a pharmacy franchise granted to Johanna Martin Endter in 1791.

Another and more recent one is a Pontifical privilege granted by Pope Leo XII in 1820 to Paulus Ruga to practice pharmacy. This is written in Latin on parchment and bound in red leather. It carries a seal enclosed in a brass case.

The most interesting one of the three, and the oldest, is a parchment folio, bound in velvet and with a great seal of red sealing wax, enclosed in a walnut case, and attached to the document by silken cords. This document is written in German, and is an imperial privilege granted to David Liebel of Nuremburg by Emperor Karl VI of the Holy Roman Empire on June 20, 1728, more than 200 years ago.

This is not an ordinary pharmaceutical franchise. It is, in effect, a perpetual grant to David Liebel to make and sell a "medicinal secret," to wit, "*Lebens Pillen*" (Life Pills), which are recommended by the maker for counteracting "*Pest, Gifte und aller menschlichen Krankheiten*" (Plague, Poison and all Human Ills).

The grant, which is unlimited as to time, provides protection to David Liebel, the pharmacist and manufacturer of these Life Pills, against the improper use of the name, the counterfeiting of the "sign" (corresponding to our trademark), and the imitation of the product itself.

This is a "patent medicine" in the literal sense of the term, and is one of the earliest on record.

The document is elaborately engrossed with many decorative flourishes. It begins with a recital of the countries over which Emperor Karl claimed domain. It bears the signature of Karl himself.

There are several formulas for "*Lebens Pillen*" in German pharmaceutical works of the last century, one of which is still found in the latest edition of "Hager's Practice of Pharmacy."

RESEARCH BY THE LINCOLN NATIONAL LIFE FOUNDATION

Feeling the need for scientifically catalogued information in special fields of public health, the Lincoln National Life Foundation of Fort Wayne, Ind., has just launched an extensive program of research by which it is expected the Foundation will collect, catalogue, and correlate many facts pertaining to health conservation. It is felt that the significance and usefulness of many points in previous studies have been unrecognized or underestimated because of the lack of such facilities.

This program is under the personal direction of Dr. H. C. McAlister, who has been appointed director of the newly established Life Conservation Division of the Foundation, and Dr. Arthur F. Hall, Jr., assistant director. Already, the director and his assistant have started correspondence with medical libraries, medical colleges, leading public health authorities, and prominent physicians and specialists.

Although no limitations have been set on the fields to be covered in this program of correlative research, the immediate activities are concerned with the facts which have a bearing upon those diseases and conditions responsible for most of the deaths in the United States.

Many of the data, it is believed, will be of sufficient importance for dissemination to the public through a program of public education which is

being contemplated. This phase of the program would include the publication of frequent bulletins on the various subjects for circulation throughout the country—to schools and colleges, clubs and societies, newspapers and magazine editors, and to other civic and community leaders. It also would include educational radio programs sponsored by the Foundation. In this educational program, however, advice or recommendations as to the treatment of disease will not be included, this being recognized by the Foundation as the proper function of the local medical profession.

Dr. McAlister is a graduate of the University of Toronto, held a Fellowship in his alma mater, and later engaged in university educational and research work.

NOTICES

THE AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY

Examinations for Certificates

The American Board of Dermatology and Syphilology will hold written examinations for candidates for a certificate in Group B (those physicians who have limited their practice to dermatology and syphilology at least five years including their period of training) on Saturday, October 28, 1933, in the following cities:

New York City; St. Louis, Mo.; Boston, Mass.; Cleveland, Ohio; San Francisco, Calif.; Philadelphia, Pa.; Chicago, Ill.

At this time applicants for a certificate are required to submit typewritten reports of ten cases personally observed, preferably in private practice.

The oral examinations for both Group A (those who have limited their practice to dermatology and syphilology for ten years or more) and Group B will be held on December 15 and 16 in New York City.

All applicants for a certificate who intend to take the examinations in either Group A or B must send their applications and other credentials to the office of the Secretary before September 1, 1933.

Application blanks and further information may be obtained from the Secretary, Dr. C. Guy Lane, 416 Marlborough Street, Boston, Mass.

UNITED STATES CIVIL SERVICE EXAMINATIONS

The United States Civil Service Commission announces the following-named open competitive examinations:

Medical Officer
Associate Medical Officer
Assistant Medical Officer

Applications for the positions of medical officer, associate medical officer, and assistant medical officer must be on file with the U. S. Civil Service Commission at Washington, D. C., not later than September 28, 1933.

The examinations are to fill vacancies occurring in the Federal classified service throughout the United States.

In addition to the general register of eligibles, a separate register will be established for each of the following optionals: cardiology; child hygiene; eye, ear, nose and throat; genitourinary (urology); internal medicine and diagnosis; neuropsychiatry, pathology, and bacteriology; roentgenology; surgery (general or orthopedic); tuberculosis; and venereal disease.

The entrance salaries for these positions range from $2,600 to $3,800 a year, less a deduction of not to exceed 15 per cent as a measure of economy and a retirement deduction of 3½ per cent. When quarters, subsistence and laundry are furnished, a further deduction is made from the salary.

Competitors will not be required to report for a written examination, but will be rated on their education and experience.

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city, or from the United States Civil Service Commission, Washington, D. C.

RECENT DEATHS

BANGS — Charles Howard Bangs, M.D., died August 6, 1933, at his home 64 Humphrey Street, Swampscott, with interment at Limerick, Maine. Dr. Bangs was born in Limerick, Maine, April 14, 1861, the son of William B. and Martha P. Sweet Bangs. He was educated in the Limerick Schools and the Limerick Academy, afterward attending the College of Physicians and Surgeons at Baltimore, Maryland, and graduating in medicine from the Bowdoin Medical School in 1892. After practicing for a short time in Sanford, Maine, he moved to Lynn where he maintained an office. His practice included patients in Boston.

Dr. Bangs was at one time president of the University of Massachusetts and a member of the faculty of Middlesex College of Medicine and Surgery. He was influential in the affairs of the latter institution. He was a Fellow of the American Medical Association and of the Massachusetts Medical Society which he joined in 1898 and from which he retired in 1930. He was interested in the early history of this country and, as a descendant of Edward Bangs who came to America in the "Anne" and landed in Plymouth in 1623, was especially conversant with the records of the Bay Colony and the descendants of the immigrants of the period.

He wrote many biographical and historical articles and was a member of the Essex Chapter, Sons of the American Revolution, the Lynn Historical Society and the Swampscott Historical Society.

He was an important factor in the Lynn tercentenary celebration and the Old Home Week.

His wife was Eva A. Parcher of Saco, Maine, who died in 1928. He is survived by a son William Parcher Bangs of Hyannis and a daughter Miss Althea Bangs of Swampscott.

SWEETSIR—Charles Leslie Sweetsir, M.D., died at his home in Lowell, May 18, 1933. He was born December 12, 1869, in Saco, Maine, and graduated in medicine from the Bowdoin Medical School in 1893 and joined the Massachusetts Medical Society in the same year. He was a member of the Mt. Horeb Arch Chapter, A.F. and A.M., Ahasuras Council Pilgrim Commandery, Knights Templars and Aleppo Temple. He is survived by his widow Margaret C. Sweetsir of Merrimac and one sister, Mrs. Frank E. Knowles of Lowell.

KIRBY — Holder Crary Kirby, M.D., of South Sixth Street, New Bedford, died July 26, 1933, after a long illness. He was born in Dartmouth, Massachusetts, in 1874. He was a graduate of the New Bedford High School and Brown University and received his M.D. degree from the University of Pennsylvania School of Medicine in 1900. He served in the Mercy Hospital of Pittsburgh and the Children's Hospital of Philadelphia and began practice in New Bedford in December, 1902, where he was recognized as a well-qualified surgeon. He was city physician of New Bedford for several years and in 1905 was appointed surgeon to St. Luke's Hospital, holding that position until 1915. In 1914 he established the Crary Clinic in North Dartmouth.

He was a Fellow of the Massachusetts Medical Society and of the American Medical Association.

OBITUARY

A MEMORIAL TO DR. EDWARD J. DENNING

Dr. Edward J. Denning, Physician-in-Chief to the Carney Hospital and Professor of Clinical Medicine at Tufts College Medical School, passed away after a short illness August 2, 1933.

Dr. Denning was born in South Boston on December 21, 1879, the son of John F. Denning and Ellen (Healey) Denning. He graduated from Boston Latin School in 1898 and from Harvard College with a Magna Cum Laude in 1901. In 1905, he graduated from Harvard Medical College and later went into general practice in South Boston.

In 1907, he married Frances Agatha Martin by whom he is survived with two daughters, Dorothy and Mary.

Becoming affiliated with the Carney Hospital in 1905, he was known as an untiring worker and a fine clinician and in 1928 was appointed Physician-in-Chief to the Hospital, which post he held until his death. For a number of years, his practice was confined to internal medicine and he maintained offices at 45 Bay State Road, Boston, his home being at 317 Clark Road, Brookline.

Of a likable disposition, he had a host of friends and was a member of the Harvard Club of Boston, the Marshfield Country Club, Wollaston Golf Club, American Medical Association, Catholic Alumni Sodality, Knights of Columbus, Massachusetts Medical Society, and South Boston Medical Society. He was a past president of the Guild of St. Luke, and medical examiner for the Pere Marquette Council, K. of C.

At a meeting of the Governing Board of the Carney Hospital, August 11, 1933, the following resolutions were adopted:

Whereas Almighty God in his Divine wisdom has called from his earthly labors our friend and associate Dr. Edward J. Denning:

And whereas we realize how well and faithfully he has labored in the vineyard of life, giving always of his best to the less fortunate and fortunate alike—ever standing by to aid when help was needed,

We, who have worked so long with him at the Carney Hospital, will greatly miss his companionship and our daily contacts with him, and are moved to feel that when he enters into the Kingdom he will hear the kindly voice of the Master as he sayeth: "Well done thou good and faithful servant."

Louis F. Curran,
Edward D. Hurley,
Francis G. Miniter,
Paul J. Jakmauh,
Edward L. Kickham,
Committee.

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

September 14-15—The Twelfth Annual Scientific and Clinical Session of the American Congress of Physical Therapy will be held at the Palmer House, Chicago. Address the Executive Secretary, 30 North Michigan Avenue, Chicago.

September 13-14—Academy of Physical Medicine. Annual Meeting at the Palmer House, Chicago. Information may be obtained from the Secretary-Treasurer, Dr. Arthur H. Ring, 163 Hillside Avenue, Arlington, Mass.

September 16—The American Board of Otolaryngology will hold an examination in Boston just prior to the meeting of the American Academy of Ophthalmology and Otolaryngology. Prospective applicants for certificate should address the Secretary, Dr. W. P. Wherry, 1500 Medical Arts Building, Omaha, Nebraska.

September 17 to 24—Microscopic, Oral Cavity, and Bone Diagnostic Demonstration of Cancer, at the Mayflower Hotel, Washington, D. C. For further information see Dr. J. C. Bloodgood's letter in issue of August 31.

September 19, 20, 21—The Connecticut Clinical Congress will meet at New Haven. Subjects for consideration: Diseases of the Blood, Diet in Disease, Industrial Injuries and Neuroses. Lectures, Demonstrations, Group Conferences.

September 25-30—The American Congress of Radiology will be held at the Palmer House, Chicago. For particulars write to Dr. Benjamin H. Orndoff, 2561 North Clark Street, Chicago.

September 29 and 30—New England Surgical Society at Boston.

October 9-12—The American Public Health Association will hold its sixty-second annual meeting at Indianapolis. For details on the scientific program write to the American Public Health Association, 450 Seventh Avenue, New York, N. Y.

October 9-13—The Clinical Congress of the American College of Surgeons will hold its twenty-third annual session at Chicago. Headquarters for the Congress will be at the Stevens Hotel.

October 13, 1933 - May 11, 1934—William Harvey Society. (Eight Lectures. Monthly.)

October 16, 17, 18—Massachusetts State Nurses' Association, Hotel Kimball, Springfield, Mass. For details write Helene G. Lee, R.N., 420 Boylston Street, Boston.

October 18—New England Physical Therapy Society. First Fall Meeting. Detailed announcement later. Dr. Arthur H. Ring, Secretary, 163 Hillside Avenue, Arlington, Mass.

October 23 - November 3—The 1933 Graduate Fortnight of the New York Academy of Medicine. The theme during the two weeks of intensive study will be Metabolic Disorders. A complete program may be obtained by writing Dr. Frederick P. Reynolds, The New York Academy of Medicine, 2 East 103rd Street, New York City.

October 25-30—International Congress on the Scientific and Social Contest Against Cancer will be held at Madrid. For information address Dr. Julio Bejarano, Atocha, 104. Madrid, Spain.

October 28—The American Board of Dermatology and Syphilology will hold written examinations for candidates in the following cities: New York City; St. Louis, Mo.; Boston, Mass.; Cleveland, Ohio; San Francisco, Calif.; Philadelphia, Pa.; Chicago, Ill. Information may be obtained from the Secretary, Dr. C. Guy Lane, 416 Marlborough Street, Boston, Mass.

December 15 and 16—The American Board of Dermatology and Syphilology will hold oral examinations in New York City. Information may be obtained from the Secretary, Dr. C. Guy Lane, 416 Marlborough Street, Boston, Mass.

April 16-20, 1934—The American College of Physicians will hold its Eighteenth Annual Clinical Session in Chicago at the Palmer House. For information write Mr. E. R. Loveland, Executive Secretary, 133-135 South 36th Street, Philadelphia, Pa.

July 24-31, 1934—The IVth International Congress of Radiology will be held in Zurich under the presidency of Professor H. R. Schniz. General Secretary Dr. H. E. Walther, Gloriastrasse 14, Zurich.

BOOK REVIEWS

Les Acquisitions Nouvelles de l'Endocrinologie. By R. Rivoire. Masson et Cie, Editeurs, Paris, 1932. Price 26 fr.

In this very readable little volume the author has attempted to review briefly all of the developments of the past ten years in the field of endocrinology. To this end, he necessarily has assembled a large amount of material of highly variable authority and, in part at least, has contented himself with quoting from original sources with but minor critical comment. In other chapters, he seeks to unify some of the highly conflicting data in the literature by amplification and personal interpretation. An illustration is found in his suggestion (page 114) that the changes of maturation depend upon the existence of the gonadotropic hormone of the pituitary only in an inert prohormonal state during infancy and childhood. At puberty, possibly through a diminution of growth hormone production, pineal and thymic involution begins and the latter may release the adrenal cortex which in turn activates the sex hormone and thus the cycle begins. The further suggestion is made that the growth hormone itself may be the prohormone of the gonadotropic agent. The mechanism as outlined is interesting even though the documentation is rather meager but it still leaves unanswered the crucial question of the factor initiating the changes of puberty. The handling of the different chapters is decidedly uneven. That on the parathyroid is excellent and particularly to be commended is the author's discriminating unwillingness to accept a parathyroid background for a variety of morbid states in which disturbance of the calcium metabolism is a real or putative feature. His resolution of the problem of human infertility (pages 124 and 125) is beautifully simple but unfortunately equally inadequate.

It is to be regretted that in dealing with the interesting and biologically active substances derived from the urine, the placenta and similar sources, the restrained conservatism in source nomenclature followed by Collip has not been more generally adopted. In the present instance, the author states an unexceptionable position but foregoes it in the body of the text.

Citation is by name only without an appended bibliography, an omission which is not serious for the presentation of material for the purpose for which the book was seemingly designed. The author shows a better knowledge of the literature from other than continental sources than is common in a foreign publication. Even so there are significant omissions as for example, failure to note the work of Koch and his associates on the testicular hormone. Foreign names have suffered somewhat at the hands of the typesetter.

One could take exception to the treatment of a number of the topics; in a measure, this could be meticulous. The author has attempted to place before his readers in orderly and coherent fashion a vast amount of mutually contradictory and unresolved material in which unrecognized chemical artefacts, as he himself points out, constitute one horn of a biologic dilemma while the other derives from an attempt to translate animal experiment directly into terms of human experience.

Recognizing the tremendous difficulties intrinsic in the task, the author has succeeded in presenting a number of interesting and suggestive observations in an attractive and stimulating form.

Atlas der klinischen Elektrokardiographie mit Anleitungen zur Differentialdiagnose. By Wilhelm Dressler. 134 illustrations and 50 plates. Urban and Schwarzenberg, Berlin and Vienna, 1933.

Dr. Dressler of the Herzstation in Vienna has compiled an atlas of clinical electrocardiography consisting of 134 electrocardiograms with a descriptive paragraph concerning each one. The idea is a good one, but for the sake of practice it would have been better not to have arranged the groups systematically. As it is they are printed in sequence as follows: (1) normal variations, (2) abnormalities of the T and Q-R-S waves associated with coronary disease, (3) bundle branch block, (4) sinoauricular block and ventricular escape, (5) a-v nodal rhythm, (6) premature beats, auricular and ventricular, (7) paroxysmal tachycardia, auricular and ventricular, (8) auricular flutter, (9) auricular fibrillation, and (10) auriculoventricular block.

The volume is neatly and compactly prepared and the curves are good, although not always excellent. A few differences of opinion with reference to interpretation are bound to arise in the case of a number of the more complicated curves such as are published in this volume, but in almost all instances the reviewer feels that the author has presented a good interpretation.

Some of the curves are very interesting and unusual, as in the case of the sequence of chronic and acute "coronary" curves in figure 20, the sequence of curves taken before and during angina pectoris in figure 25, the disappearance of bundle branch block in figure 42, the development of bundle branch block with exercise in figure 45, the temporary disappearance of bundle branch block after long diastoles in auricular fibrillation in figure 49, and the alternation of a-v nodal rhythm in figures 70 and 73.

It is open to argument, however, whether the inverted T wave in Lead 1 with left axis deviation such as that shown in figure 12 is due to the degree of left axis deviation alone or to myocardial disease from coronary insufficiency. In figure 17 the high T waves in Leads 1 and 2 do not rule out coronary disease. In figure 18 the low voltage of the Q-R-S waves in all leads should have been mentioned as just as important as the abnormality in the T waves. In figure 26 the condition would be considered by most cardiologists clearly that of bundle branch block rather than arborization block, even though the voltage is not very high. Also a good many, following the new work of Wilson and others, would believe this type of bundle branch block to be left bundle branch block as opposed to the older classification of right bundle branch block. In figure 34 the long P-R interval is probably at least as important as the changes in the Q-R-S and T waves. In figure 44 there is again the question of the significance of the inverted T wave in Lead 1. In figure 66 the condition is really auriculoventricular dissociation rather than a-v nodal rhythm. Sometimes the P waves fall into their normal position, sometimes with the Q-R-S waves, and sometimes do not appear at all. In figures 76 and 84 the ventricular premature beats would be interpreted by many as the opposite of that stated in the book, following the revised nomenclature. In figure 94 the interpretation should be almost certainly paroxysmal auricular tachycardia and not a-v nodal rhythm.

One of the most valuable features of the book is that with some of the curves clinical notes are added in addition to the interpretation. The book would have been still more valuable if all the curves could have been so accompanied. There are clinical notes for about half the records.

This volume can be recommended for practice and experience to those who have already had training in the fundamentals of electrocardiography.

A Text-Book of Neuropathology. By ARTHUR WEIL, M.D. Lea & Febiger, Phila., 1933. 335 Pages. Price $5.00.

The last text on the pathology of the nervous system was published in 1921. Since that time there has grown up a large body of literature on this ever-increasing subject. We are fortunate, this year, in having at least two new books by well-known, recognized authors. The volume under consideration, by Professor Weil of Northwestern University Medical School, Chicago, is a brief but adequate account of the various changes in the nervous system produced by disease or injury, with an appendix on laboratory technique. Accurately and cleanly written, with excellent illustrations, this book should be a splendid addition to the subject. It is marred, however, by a number of minor errors, which, no doubt, can be easily corrected in future editions. The subject is continually growing and even since this book was published new pathological data have been added to the sum of our knowledge, such, for instance, as Cushing's description of the basophilic adenoma in the pituitary body. The book contains a short critical bibliography and a good index. The illustrations are clearly produced and, in general, the appearance of the text is satisfactory.

Die Bruchoperation Nach Bassini. VON DOKTOR ATTILIO CATTERINA, O.O. Professor der chirurgischen Operationslehre und der klg. Universität in Genua. Mit 16 farbigen Bildern von Maler Horatius Gaigher, Doktor der gesamten Heilkunde. Published 1933 by Urban & Schwarzenberg, Berlin und Wien.

Professor Catterina, having been a student of Bassini's, brings to us in this book a description of Bassini's hernia operation in its original form. Dr. Gaigher's drawings, which are very well done and very clear, make it possible for one to visualize each step of the original operation, even if he is unable easily to translate the German text which describes the various steps.

Hardly any operation is as frequently performed by a general surgeon as is that for the repair of an inguinal hernia. Practically every surgeon does an operation which he calls a modified Bassini, but rarely does he follow every step of the operation in the method described in Dr. Catterina's glorified monograph. Several modifications are of advantage and we believe that if Bassini were still doing surgery he would make some changes himself. For instance, not many surgeons now remove the cremasteric muscle from the cord and discard it. If it is cut so as to obtain a clearer view of the cord and an easier handling of the sac, it later is sewed back so as to maintain support of the testicle. Another step which I rarely see is the incision of the transversalis fascia as shown in Plate 10, with the exposing of the deep vessels.

In a word, this book is worth examination by

those who do surgery and may be useful in teaching, as it gives a clear idea of a standard operation first performed and described about forty years ago by a great surgeon.

La Technique de la Curiethérapie (The Technique of Radium Therapy). By LE DR. SIMONE LABORDE, Chief of Service of Radium Therapy at the Institute of Cancer. Published by Gauthier-Villars et Cie, Editeurs. Paris, 1933. Paper. 118 Pages. Price 20 francs.

This treatise on radiation comes from one of the pioneer institutes in radium therapy. The introduction is devoted to the concepts of radio biology. It deals with the factors of radiosensibility, the distribution of doses of radiation, the influence of different qualities of rays, and the direct and indirect action of radiation.

The first chapter deals with various types of radium applicators. The second chapter gives methods of application. The determination of dosage and the duration of irradiation with its local and general effects are discussed in the third chapter. The fourth and last chapter deals with measuring apparatus and dosage units. There is appended a table of physical constants.

This book is of undoubted value to the specialist in radiation therapy who is particularly interested in the physical and biologic aspects of radiation.

Traité de Physiologie Normale et Pathologique, Tome IX, *Système Nerveux,* Part 1. Published under the direction of G.-H. Roger and Léon Binet. Masson et Cie, 1933. 566 Pages. Price 100 francs.

This volume is one of two that are to be issued on the physiology of the nervous system by the combined efforts of a number of French investigators. The two volumes, in addition, are part of a larger series of books which will cover the physiology of the whole body. This volume is a well written account, with illustrations, and covers the subject thoroughly. It can be highly recommended as a textbook and should find its place on the library shelves of all physiologists, particularly those interested in the special physiology of the nervous system. The price seems reasonable in view of the high charges for textbooks at the present time.

Health and Environment. By EDGAR SYDENSTRICKER. McGraw-Hill Book Co., Inc. New York. 1933. Pp. 217.

Dr. Sydenstricker's studies of health in relation to environment cover the nature and extent of ill health, geographic environment, urban and rural environment, and the effect of economic status on social and occupational environment. There is a general study of the trend of mortality, and two interesting chapters at the end, one dealing with environmental changes in health, the other genetic aspects and trend of mortality. The importance of environment in determining mortality and morbidity is stressed. No answer can be given on the vital point as to whether the recent selective forces set in motion by environmental changes have led to an improvement or deterioration of the racial stock.

As a brief and compact presentation of important facts, the book is decidedly of service. It also forcibly calls our attention to the inadequacy of the data on which profound social changes are urged by various groups.

BOOKS RECEIVED FOR REVIEW

Clio Medica. Edited by E. B. Krumbhaar. X. Nutrition by Graham Lusk. Published by Paul B. Hoeber, Inc. 142 Pages. Price $1.50.

The Surgical Clinics of North America. June, 1933. Vol. 13, Number 3. Lahey Clinic Number. Published by W. B. Saunders Company. 275 Pages.

The Operative Story of Cleft Palate by George Morris Dorrance. Assisted by Enayat Shirazy. Published by W. B. Saunders Company. 564 Pages. Price $6.50.

Fractures by Paul B. Magnuson. Published by J. B. Lippincott Company. 466 Pages. Price $5.00.

The Control of Football Injuries by Marvin Allen Stevens and Winthrop Morgan Phelps. Published by A. S. Barnes and Company. 241 Pages. Price $3.00.

Cancer and Other Chronic Diseases in Massachusetts by George H. Bigelow and Herbert L. Lombard. Published by Houghton Mifflin Company. 355 Pages. Price $4.00.

The Therapeutic Agents of the Quinoline Group by W. F. von Oettingen. Published by The Chemical Catalog Company, Inc. 301 Pages. Price $6.00.

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